COMPUTERWORLD

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	370/148	3031	370/158	370/158-3	3032	370/168	370/168-3	3033
Purchase Price[1]	689,000[5]	1,455,000[6]	1,915,200[6]	2,001,100[6]	2,368,000[6]	2,884,780[7]	3,103,210[7]	3,605,000[8]
Purchase Price[2]	689,000[9]	1,455,000	1,966,965[10]	2,052,865[10]	2,728,000[11]	3,581,530[12] 4,105,030[13]	3,838,350[12] 4,388,460[13]	3,605,000
Price/Mo[3] (Four-Year Lease)	17,280	39,310	55,820	59,600	58,470[6] 67,470[11]	96,384[12] 110,874[13]	107,635[12] 122,629[13]	77,480
Maintenance/Mo	2,235	3,690	3,189	3,234	7,110[6] 7,675[11]	7,809[12] 9,305[13]	7,970[12] 9,466[13]	8,320
Relative CPU Power[4]	23	52	46	52	135	100	109	170
Memory Size in Byte (Minimum-Maximum)	1M-2M	2M-6M	512K-6M	512K-6M	2M-6M	1M-8M	1M-8M	4M-8M
Memory Cycle Time (Nsec)	405-540	345-805	620-1,035	620-1,035	320	320	320	290-464
Machine Cycle Time (Nsec)	180-270	115	115	115	80	80	80	58
Channels (Minimum-Maximum)	5 Standard	6 Standard	3 Standard-6	3 Standard-6	6 Standard-12	0-12	0-12	12 Standard-16
Price/Channel	Built-In	Built-In	4th-14,970 5th-13,930 6th-7,005	4th-14,970 5th-13,930 6th-7,005	360,000/6 channels	Note 14	Note 14	320,000/4 channels[15]
Multiprocessor Configurations?	No	No	Yes	Yes	No	Yes	Yes	No
Buffer Capacity	0	32K	16K	16K	32K	32K	32K	64K

1. Includes CPU, power supply, operator's console, memory.
2. All of 1 with channels added.
3. Lease rate based on purchase price in 2.
4. 360/50 = 10. International Data Corp. estimates; CW estimates for 3031, 3032.
5. With 1M-byte memory and standard channels.
6. With 6M-byte memory and standard channels.
7. With 6M-byte memory, the extended channel feature (3855), but no channels.
8. With 6M-byte memory, 12 channels standard.
9. Five channels standard.
10. With six channels - three standard, three optional.
11. With 12 channels - six standard, six optional.
12. With six channels, all optional.
13. With 12 channels.
14. The 2870 byte multiplexer channel costs $117,900. The 2880 block multiplexer contains two channels for $174,500.
15. Users must add four channels; choice of four block multiplexers or three block multiplexers and one byte multiplexer.

Faster, Cheaper Than 370s

Two CPUs Stretch IBM 30 Series

By E. Drake Lundell Jr.
CW Staff

WHITE PLAINS, N.Y. — Huge price reductions but little in the way of new technology marked IBM's announcement last week of the latest members of its 30 series of processors.

The 3031 and 3032 join the 3033 in the new line, which is rapidly obsoleting the intermediate and upper end of the firm's 370 series of computers through a combination of increased performance and cut-rate prices.

The central processors achieve performance gains of over 150% through the increased use of firmware, improved cycle times and four-way memory interleaving, IBM said.

In addition to offering users improved performance, the systems may be aimed at stopping competition from plug-compatible CPUs since they either undercut or match the prices of comparable systems from Amdahl Corp. and Itel Corp., which have been making inroads into the IBM large system domain.

The units announced last week join the 3033 processor announced late last March as the IBM upgrade paths for the now five-year-old 370 series. They will be delivered at the same time as the 3033 — the first quarter of 1978.

The 3031 offers an instruction execution rate that is 2 to 2.5 times the rate of the 370/148, according to IBM, and uses a similar jobstream running under DOS/VS Release 34 or OS/VS1 Release 6.

The system cost is roughly double that of a 148. However, figures developed by *Computerworld* (see chart above) indicate that the 3031 is actually more comparable to the 370/158-3. CPU power is roughly equivalent to that system — at a price reduction of almost $600,000 for an

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Workers Want Voice in Data Use

By Ann Dooley
CW Staff

W. LAFAYETTE, Ind. — Ninety-two percent of the employees of five major U.S. corporations would prefer to be consulted before their employers release personal information about them to outside organizations, according to a study published recently by Purdue University's Information Privacy Research Center.

The percentage dropped to 76% when the release of personal information was on an internal level.

The study, which examined the five corporations' actual information policies as well as more than 2,000 employees' perceptions of those policies, found that most employees don't really know how the data in their personnel files is used. Their perceptions varied according to salary, sex and length of time with the company.

Less than half of the respondents believed they were allowed to examine their personal records, while many did not know if they could. Older employees believed more often than any other group that they could examine their files.

Only 14% of those studied had actually examined their files, the study found.

Approximately 44% of the respondents believed they were allowed to correct wrong information; almost one-third indicated they did not know whether they could make corrections.

Nearly one-third of the respondents expressed some amount of dissatisfaction with their employers' handling of personal data. However, when asked whether they had an experience which upset them regarding internal or external release of information, very few said they had, according to the study.

Nearly 43% of the respondents said they thought their employers were doing a good job in protecting their personal privacy, 8% disagreed and 43% said they didn't know.

Those who had actually examined their files were found to have a more accurate knowledge of what was stored, were more satisfied with their employers' practices and believed their employers were doing a good job in

(Continued on Page 4)

Alleged Dog Track Swindle Bilks Bettors of $1 Million

By Jeffry Beeler
CW Staff

MIAMI — Bettors at a local dog track were apparently bilked out of $1 million in legitimate winnings as a result of an alleged swindling scheme involving six men and a computer.

Martin Dardis, chief investigator for State Attorney Richard Gerstein, estimated the suspected conspirators may have been shortchanging trifecta winners at the Flagler Dog Track here for as long as five years.

Suspects in the case include three employees of Automatic Totalisator Co., a supplier of parimutuel betting equipment, and three Flagler workers.

Four of the men have been arrested and charged with grand larceny and conspiracy. A fifth suspect is still at large and the sixth, Automatic Totalisator computer operator Richard Hudson, has agreed to turn state's evidence in return for immunity from prosecution.

Dardis said the suspects swindled "untold hundreds" of bettors by juggling figures from the dog track's two Digital Equipment Corp. PDP-8/Es to show inflated numbers of winning trifecta tickets.

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NEWSPAPER

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At Contu Hearing

Program Copyright Gains Support

By Edith Holmes
CW Staff

CHICAGO — During a hearing of the National Commission on New Technological Uses of Copyrighted Works (Contu) here recently, industry associations lent their weight to the proposal that copyright protection be given to computer programs.

Two organizations, however — the Computer and Business Equipment Manufacturers Association (Cbema) and the Information Industry Association (IIA) — stressed the need for a tighter definition of "computer program" in the law and pointed out the importance of defining "computer."

Contu's Software Subcommittee definition of "computer program" also received criticism from Philip H. Dorn, a consultant and member of the Association for Computing Machinery's (ACM) Legal Issues Committee, who said neither subroutines nor program modules receive adequate protection.

Cbema and IIA officials suggested Contu's proposed definition of "computer program" add the word "indirectly" to read: "A 'computer program' is a literary work that consists of a series of statements or instructions in a form and order intended to be directly or indirectly utilized in a computer to cause it to achieve a certain result through the performance of a series of steps of a process."

Source Programs

The change becomes important because of the way in which a computer reads source programs, Frank H. Cullen, a Cbema member and manager of patent headquarters for Burroughs Corp., explained.

"Many programs are written in source code using a high-level language and that code needs to be compiled into the object code which directly causes a computer to achieve a certain result," he said.

"Such object code may not need to be generated as a collection of statements or instructions; rather it could theoretically be generated and used internally only as needed," Cullen added.

Cbema and the IIA have given their support to the use of copyrights for software program protection, but opponents have had their say, too. Now, with its hearings over, Contu must decide what recommendations it will send to Congress.

Dorn called the software subcommittee's proposal "reasonably good," but identified a "problem with the limits of what is a 'series of instructions.'"

Modules and subroutines are a problem because they don't stand alone. They need other modules or subroutines to operate, Dorn noted.

Because programs "tend to be released in a very immature form," Dorn said copyright protection is also explicitly needed for subroutines.

Not all organizations and individuals agree with Cbema and IIA that computer programs should be protected by copyright.

ACM Disagrees

"Copyright protection would be of little or no use and difficult to enforce," according to Susan Nycum, an attorney who chairs ACM's legal issues committee. Nycum added that commercial programs are now protected by trade secret law.

Contu member and Pulitzer Prize-winning author John Hersey reiterated his position against copyright protection for computer programs at the meeting here.

Computer programs are not literary works and should not be protected under a law designed for literary works, Hersey stated.

"A programmed set of orders in a microprocessor is not a literary work any more than a distributor of an automobile is a literary work," Hersey said. Software is a machine control device, he argued.

But writers of software don't agree. "We believe copyrights would give us extra protection to that offered by property law," Martin Goetz, senior vice-president of the software products division of Applied Data Research, maintained.

With its hearings completed and the public comment period on its draft proposals for copyrighting software and data bases over, Contu must now review all that it has heard in preparation for completing the recommendations it will send to Congress.

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That's what happened in this case. Those industrious and ingenious elves in the dark forests around Armonk didn't fail us. They came up with a couple of winners in the new "eights."

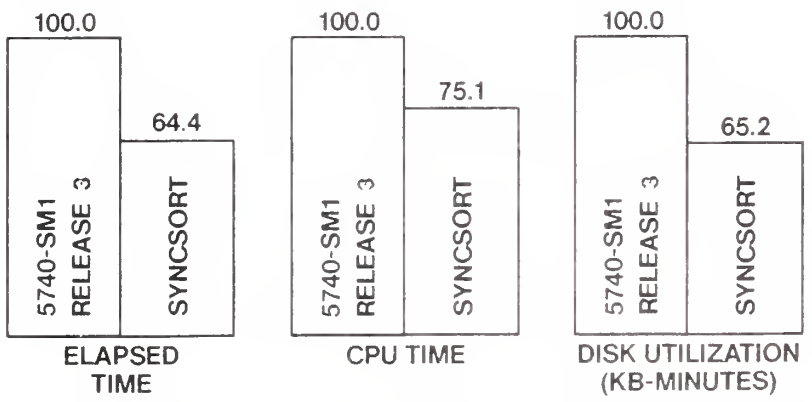
Our friends who put out the *EDP Industry Report* — the "Gray Sheet" — assessed the importance of the new 138s and 148s as follows:

> "Perhaps the biggest single development of 1976 was IBM's introduction of two new 370s . . . and new price/performance curves to go with them . . ."

We couldn't agree more. The new "eights" really do yield more "bang for the buck" as the Gray Sheet puts it.

But we'd like to add a footnote to that: The bang will be considerably louder if you sort with SyncSort rather than IBM's 5740-SM1, Release 3. (*It* must have been made by a *different* bunch of elves.)

If you'd care to prove that for yourself, just try a couple of benchmarks comparing the two sorts on exactly the same files. You'll see a picture of resource usage that looks like this:



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White House Takes Action On Data Flow, Privacy Act

By Nancy French
CW Staff

WASHINGTON, D.C. — Transborder data flow and the protection of privacy is now getting White House attention, according to Christine Dodson, executive secretary of the National Security Council.

Dodson was charged with the responsibility of finding out what the "American interests" might be in the subject of transborder data flow less than a month ago, when a formal committee was set up within the National Security Council with Dodson as the "action officer."

Until that time, the issue of transborder data flow for American business was handled by an interagency task force set up last December under the Department of State.

There is also a glimmer of interest on the part of President Carter in the recommendations of the Privacy Protection Study Commission concerning new privacy standards for government recordkeepers, according to David Linowes, formerly chairman of that commission.

To date, Linowes has had several meetings with the White House staff member responsible for coordinating Privacy Act implementation within the federal government. All department secretaries have been requested to submit implementation plans to the White House; to date, three have complied.

No further action is expected on the private-sector data privacy bills introduced in the House of Representatives by Barry Goldwater Jr. (R-Calif.) and Edward I. Koch (D-N.Y.) until after the first of the year, according to Carole Parsons, executive director of the Privacy Protection Study Commission.

Over the Border Means Out of Control

LONDON — The Internal Revenue Service (IRS) has become interested in the information it could gain from U.S. time-sharing companies whose data bases contain information belonging to certain overseas customers — such as Swiss banks, according to Donn Parker, a senior research associate at SRI, Inc. in Menlo Park, Calif.

Speaking at a computer security symposium here recently, Parker told the story of a Swiss bank which contracted with a U.S. time-sharing service firm to process its data. Rather than processing and maintaining the data in Switzerland, however, the American firm sent it to its computer installation in Rockville, Md.

Bank records are not subject to subpoena by tax officials in Switzerland; however, they are in the U.S.

Parker said he mentioned this in an article he wrote for the *New York Times*. About a week after the article appeared, two IRS representatives paid him a visit to learn more about this practice.

Parker told them all he knew, he said, which wasn't very much because time-sharing firms "studiously avoid knowing anything about the contents" of their customers' records and because the friend who told him about the contract didn't know any more.

It was never determined whether the records the time-sharing firm maintained for the bank were numbered accounts or some other type of data.

But the moral of the story, according to Parker, is that under existing laws, foreign banks or any other businesses can't expect to guarantee their customers the usual level of confidentiality when another firm is processing their data in another country.

Study Finds Workers Unaware of Data Rights

(Continued from Page 1)

protecting their privacy.

Knowledge about the kind of information to be released internally would decrease employee concern, according to 87% of the respondents. Prior knowledge of the type of externally released information was important to 94%, the survey showed.

Standards Vary

The study, conducted early this year, included one questionnaire answered by employees, on their perceptions and "comfort" with the use and maintenance of private data; another questionnaire answered by senior recordkeepers in each corporation probed their actual practices.

All the corporations expressed concern about privacy of their employees, but the recordkeeping standards varied from company to company and even within departments.

None of the corporations had written procedures for release and handling of personal information, but all agreed they had an informal policy that placed restrictions on all but job-related uses of information.

All the companies had assigned responsibility to a specific person for the privacy protection of their employees.

Three of the five companies had no written policies allowing employees to amend their records, but three companies permitted their employees to inspect their personal records. In one case, state law required employee records to be made available upon request.

Some of the companies indicated they advised and obtained prior consent from employees concerning certain kinds of external disclosure such as data released to attorneys representing other people, medical practitioners, political parties, government agencies, insurance companies and lending institutions.

Proper Disclosure

Consent for release was usually sought for research organizations, courts with subpoena power, law enforcement agencies, educational institutions and unions.

Study results showed employees felt data used for organization decision making regarding prior or possible performance was proper. But they felt that personal information used for research, charity drives and general or specific auditing was improper, and their comfort levels declined accordingly.

However, certain types of information appeared sensitive for all internal use. More than 50% felt the use of personal financial information, other than payroll, was improper for all internal uses.

The study did find that employees approved of the release of personal data if it was relevant to the decision-making process. For example, releasing medical information was acceptable to the respondents when it was used in hiring or job assignment decisions.

Employees considered political parties, mailing list companies and attorneys representing other people least proper to receive personal information and considered courts with subpoenas, local and state governments and the Internal Revenue Service most proper to receive information.

Typical Respondents

Respondents were mainly white-collar office workers, including middle and higher level managers, engineers, scientists, supervisors, analysts and technicians as well as clerical personnel, secretaries, skilled craftsmen and semiskilled workers.

The majority of respondents was drawn from a random sample and was made up of males with a college degree between the ages of 30 and 39. The average respondent had worked for his company for more than 15 years in a nonsupervisory capacity and earned more than $25,000.

Higher paid employees had the most accurate perceptions of company recordkeeping practices and males were more accurate than females, the study found. These two statistics are closely related, since most females were paid lower wages than males.

Overall, those with the most accurate perceptions were older, earned higher salaries and had been with the company for a longer period of time. In addition they tended to be more satisfied with the company's practices.

Types of Data

One section of the employee questionnaire contained a list of 60 different types of personal data and asked which ones employees believed might be stored by their employers. The perceived answers were compared with the data obtained from the recordkeepers on what the actual policy was.

For the most part, employees overestimated the types of personal data their companies stored, particularly in regard to the kinds of affiliations and activities in which they were involved.

But employees underestimated the types of medical information kept, believing many items were not stored when in practice they were.

The study concluded that employees were not greatly concerned about the use of personal information within a company or were concerned about release for use for certain purposes outside the company. It also concluded that informed participation by the employee diminishes concern.

The study cautioned, however, that the data cannot be generalized as representative of all employees in all U.S. corporations and should be considered an attitudinal study based on one point in time.

Copies of the study can be obtained through the Information Privacy Research Center, Krannert Graduate School of Management, Purdue University, W. Lafayette, In. 49707.

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EEC Moving Toward Data Protection Accord

By Nancy French
CW Staff

STRASBOURG, France — The European Economic Community is moving toward adoption of an international agreement that would provide minimum uniform data protection among member countries — a move hotly contested by U.S. firms presently operating there [CW, Oct. 3].

At a meeting here recently the Council of Europe's Subcommittee on Legal Affairs continued to refine a proposed data protection convention that would require countries to take whatever measures are necessary to ensure protection for personal data processed in their territories. Signers of the convention would have to assure that the rights, liberties and essential interests of individuals are respected, regardless of nationality.

U.S. multinational companies and time-sharing/service firms oppose such a convention and the regulatory body that would go with it on grounds they could impose a burdensome and costly layer of restrictions on their international operations. They also contend that evidence of privacy abuse that would warrant such an agreement has not been presented.

The U.S. would be unable to comply with such a convention as things presently stand, since it has no data protection authority or licensing board to coordinate compliance and no privacy laws that are binding on private-sector organizations.

However, the Europeans are apparently unconcerned about lack of U.S. participation in development of the agreement. F.W. Hondius, who heads the directorate of legal affairs which met here, reminded participants that they have a mandate to develop a data protection convention by Dec. 31, 1979 — with or without American participation.

If the agreement is adopted by the European countries, the U.S. apparently would be bound by its provisions if it wished to continue to transmit data between itself and the member countries and/or process data there.

Terms of Convention

The convention, which is seen by some Americans as naive and not based on the type of empirical evidence of privacy abuse turned up by the U.S Privacy Protection Study Commission, calls for protection of any [computerized] information relating to identified or identifiable natural persons — but excludes legal persons — or businesses.

The convention would require countries to assure that an individual could query the "controller of an automated personal record" to learn whether a record on him exists and then could obtain and correct it.

No exceptions would be permitted other than in cases where the law defines files as legally secret.

The "controller of the record" would be required to assure that personal data is collected 'by lawful and fair means,' and that it is "accurate and up-to-date as well as appropriate and relevant to the purpose of the record."

In addition, data which reflects racial origin, philosophical, religious, political or trade union views of a person would not be permitted in record systems without the individual's consent or unless expressly authorized under another provision of the law.

Inaccurate data would have to be corrected. Obsolete, inappropriate or irrelevant data or data recorded in violation of other provisions of the convention would have to be "erased," the convention said. However, it does not require the controller to contact other organizations to whom that information may already have been provided.

Installation Protection

The convention also calls for the processor of the record to protect DP installations and devices as well as the data and programs stored there against accident, wilfull loss or destruction, unauthorized access, alteration or release.

Each contracting state would be responsible for all DP installations within its own territory. However, in cases where such installations form parts of a DP system distributed over two or more countries, the privacy board in each country would have to cooperate to provide the necessary protection of information.

The controller of a personal record distributed over two or more countries would decide and then declare which of the states is the official domicile of the records. The country that accepts responsibility as the official domicile of such a distributed record would be required to inform the other contracting states accordingly.

Then, wherever else the data goes, it would be required to receive the same protection afforded it in its official domicile.

Any decision, ruling, injunction or judgment made for the protection of a data subject against any controller or processor of an automated personal record in one contracting state shall be given effect in every other contracting state, the proposal said.

The privacy authority in each country would be required to furnish information on its laws and regulations to the other signers of the convention. They would also be required to verify the existence of automated records.

In addition, they would be expected to transmit requests from data subjects to the appropriate countries and investigate problems that occur.

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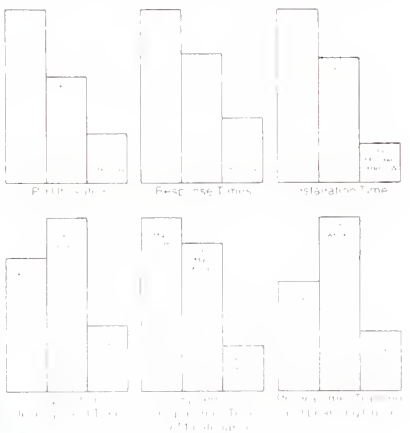

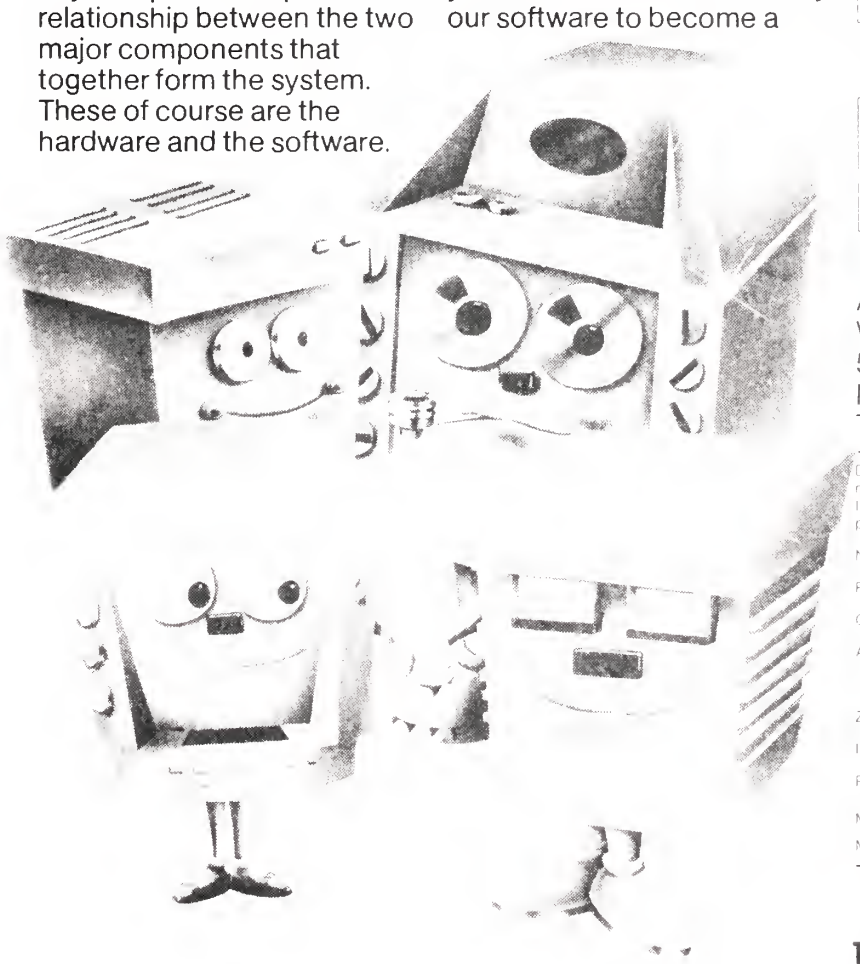

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IBM 3031, 3032 Offer More Power

(Continued from Page 1)

equivalent 6M-byte configuration.

Similarly, the 3032 processor offers 2.5 to 3 times the internal instruction rate of a similarly configured 370/158-3 running under Release 3.7 of OS/VS2 MVS, IBM said, at a price increase of about 20%.

Again, the *Computerworld* figures indicate the system actually has more internal power than the 370/168-3, even though its price tag is $1.6 million less than that for a 168-3 in a 6M-byte configuration.

Although IBM chose not to emphasize the price reduction aspects of the 3031 and 3032 by comparing them to dissimilar machines, the move was already dubbed "the greatest price cut in industry history" by several observers last week.

In all, the reductions amounted to 40% on the systems compared with their 370 counterparts.

Like the 3033, the 3032 and 3031 have very low purchase/lease and purchase/rental ratios, which are used by the industry to determine the expected systems life for IBM products.

Initially on the 370 series, the purchase/rental ratio was set at about 45 months. Using the same techniques for the 3031 and 3032, that ratio drops to around 35 months, an indication that the firm expects them to be actively marketed for only three to five years, compared with the four to seven years expected for the earlier units.

Move to Firmware

The systems continue the trend of placing operating systems in firmware. Both have the System/370 Extended Facility as a standard feature, which is also standard on the 3033 and an option on the 168-3.

This firmware incorporates certain functions previously found in software that can be called by IBM's MVS/System Extensions program product. With the use of this firmware, throughput is increased through reduced supervisor path lengths, better resource control and less software contention, according to IBM.

In addition to MVS, VM/370 will be available on both machines at the time of first deliveries, as will DOS/VS for the 3031 only. SVS, OS/VS 1 and the Airline Control Program (ACP) will be offered on the machines during the second quarter of 1978, IBM promised.

Intriguing Features

The most intriguing features of the two systems are four-way memory interleaving and the instruction preprocessing of the 3032 and the instruction prefetching on the 3031. These, coupled with the faster cycle times, add up to the performance improvements, IBM said.

The four-way interleaving — a standard feature — compares with the two-way interleaving available on earlier 370s.

The 3032 separates the preprocessing and execution functions, permitting the system to prepare one or more instructions while it is executing still another, IBM said. The preprocessing function is built into firmware and runs in its own buffer memory.

Similarly on the 3031, several instructions can be prefetched while one is being executed, with the prefetching done by firmware in separate buffers.

The units are compatible with members of the 370 family and use the same peripherals.

Both of the systems feature 32K of buffer storage compared with the 148, which had no buffer storage, and the 158, which had 16K buffer storage. The 168 also features 32K buffer storage and the top-of-the-IBM-line 3033 has 64K of buffer memory.

The basic machine cycle time is 115 nsec for the 3031 and 80 nsec for the 3032. For the 148, the cycle time is 180- to 270 nsec; on the 158, the cycle time is 115 nsec.

A similar pattern appears for the memory cycle times of the machines. On the 3031, the time is 345- to 805-nsec compared with the 148's 405- to 540 nsec memory cycle time and the 158's 620- to 1,035 nsec cycle time.

The 3032 with a memory cycle time of 320 nsec is more comparable to the 168-3, which also sports a 320 nsec memory cycle time.

Both of the units are available with 2- to 6M-byte main memories, but the 3031 is upgradable in 1M-byte increments while the 3032 can be upgraded only in 2M-byte steps.

Both units feature six built-in channels consisting of one byte-multiplexer channel and five block-multiplexer channels. The byte multiplexers operate at a rate of 40- to 75K byte/sec and each block multiplexer is capable of speeds up to 1.5M byte/sec.

The 3032 can accommodate an optional channel block with the same characteristics as the first six channels.

Channel Feature

In addition, the 3032 offers an optional two-byte-wide channel feature that can operate up to 3M byte/sec, IBM said.

This unit was designed to handle high-speed I/O devices such as the 2305-1 disk unit and the 3838 array processor, IBM said.

While neither of the systems is available in true multiprocessor configurations, an optional channel-to-channel adapter is available that allows communications between channels on different processors of a loosely coupled multiprocessor system, IBM said.

The 3031 in a 2M-byte configuration sells for a flat $1 million, rents for $27,497/mo and is available on a four-year lease for $25,000/mo.

For a 6M-byte system, the purchase price is $1,455,000, rental runs $43,207/mo and the lease rate is $39,310/mo.

The 3032 sells for $1.9 million in the 2M-byte configuration, which is available at $48,110/mo on rental and $43,740/mo on lease.

The 6M-byte 3032 carries a $2,368,000 purchase price tag, rents for $64,290/mo and leases for $58,470/mo.

Itel Reacts

SAN FRANCISCO — Within hours of the IBM 3032 and 3031 announcements, Itel Corp. announced its AS/6 processor, which is reportedly 1.1 to 1.25 more powerful than the 3032 and four to six times as powerful as the firm's AS/5-3.

The AS/6 Model 7032 CPU features a 72 nsec machine cycle. The unit comes with a standard 2M bytes of memory and can be upgraded in 1M-byte increments to a maximum of 16M bytes. The unit uses a 64K-byte buffer, according to the firm.

An AS/6 with the 7032 CPU and operator console, two I/O processors with a total of six channels and 2M bytes of main memory cost $1.96 million compared with $1.9 million for a 2M-byte 3032.

Dog Track Bettors Bilked

(Continued from Page 1)

In a legitimate operation the two computers, which operate in parallel, would generate duplicate lists of winning ticket numbers at the same time. At Flagler, however, the suspects turned off one of the machines for a few minutes after each race and entered the ticket number of fictitious winners, Dardis said.

Thus, when they turned it back on, the computer indicated many more winning tickets than in fact existed. At times, the imaginary winners outnumbered the legitimate ones by three or four to one, Dardis explained.

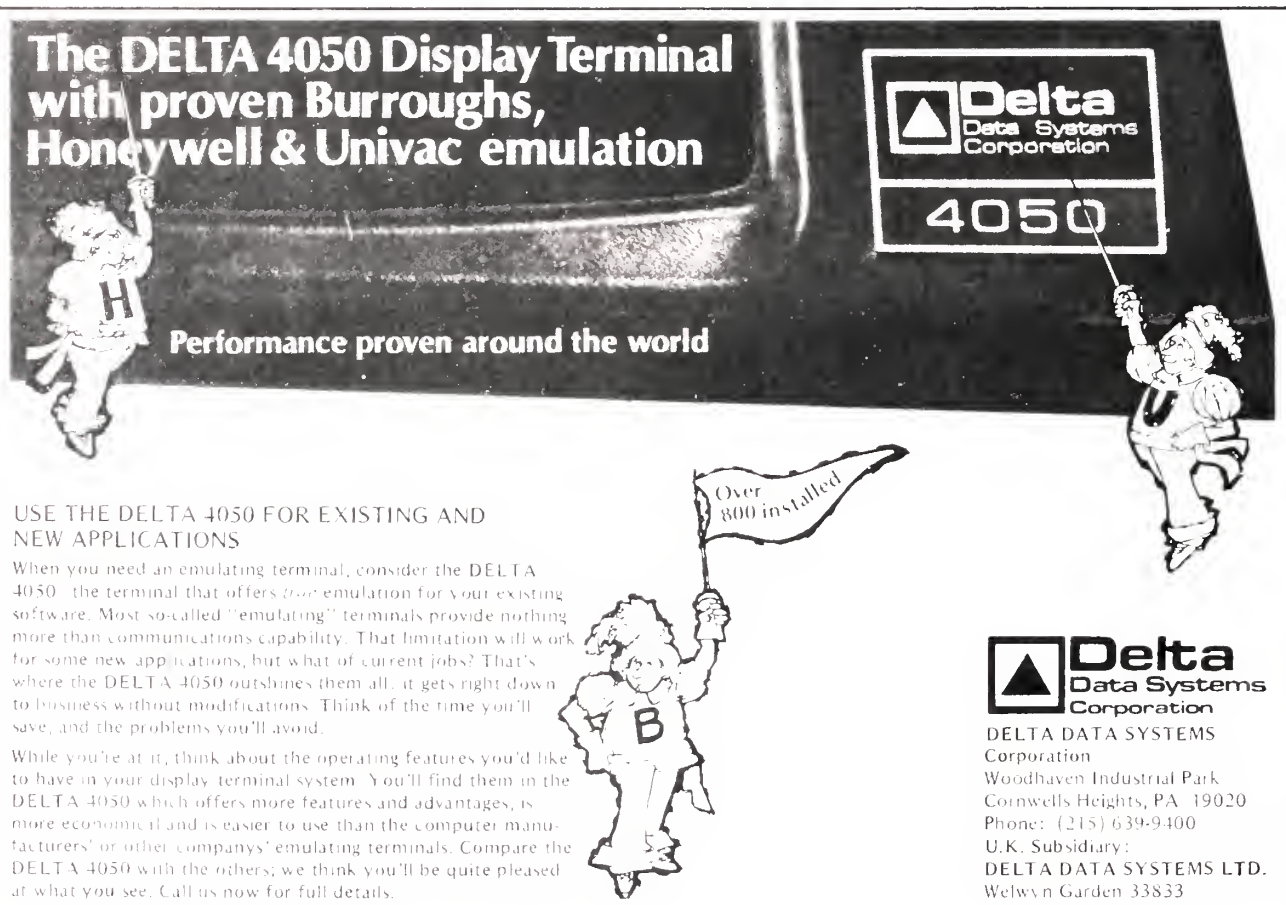
To conceal their actions, the suspects then destroyed the output of the other computer and printed phony tickets, which they cashed at the track the next day, he added.

By increasing the number of apparent winners, the conspirators were able to minimize the payoff to each legitimate winner and keep the leftover funds for themselves, Dardis alleged.

In devising their plan, the suspects took advantage of the fact that the results of trifecta gambling are seldom publicly displayed, as are the odds and winnings for almost every other form of greyhound betting. Instead, Flagler's trifecta information is stored in the computers because of the large number of variables involved.

As a result, the duped trifecta bettors had no way of finding out how much they had won except by asking the very officials who were involved in the alleged swindle, the chief investigator explained.

State legal authorities first became suspicious of Flagler's trifecta betting operation when a customer who apparently was not involved in the conspiracy cashed winning tickets totaling $156,000, "which is an unusually large amount," Dardis recalled. When they investigated further, authorities found that all the tickets had come from one printer and that they exceeded the value of all the legitimate tickets that had been generated by that machine.



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IBM Opposes Trial Examiner, Cites Conflict

By Catherine Arnst
CW Staff

NEW YORK — IBM has asked that an order appointing an examiner in the U.S. vs. IBM antitrust trial be struck down on the grounds of conflict of interest. The examiner was named to search IBM corporate files for statistical information on its installed systems.

IBM is opposing Judge David N. Edelstein's appointment of Herbert H. Isaacs, an accountant with Arthur Young & Co., because Isaacs is also working as a paralegal in support of Memorex Corp.'s pending antitrust case against the mainframer [CW, Sept. 12].

Although Edelstein knew about the Memorex connection, he did not mention this potential conflict of interest in his order.

IBM filed a writ of mandamus with the Second Circuit Court of Appeals to ask it to "intercede and correct this blatant use of judicial power." IBM's writ complained that Isaacs would be acting on behalf of the government and would have broad power to examine corporate files and question employees under oath.

"The broad powers delegated to the special master . . . should not be conferred upon a nonlawyer employee of an accounting firm as they were here," IBM said.

The order, the writ said, should be nullified as "an irresponsible abuse of discretion" because of Isaacs' involvement with Memorex, whose lawsuit against IBM involves "virtually identical issues as those now on trial in U.S. vs IBM."

IBM also claimed that it was given only one day to respond to the names the government suggested to Edelstein for the examiner's post and that the government "made no attempt to seek agreement with IBM counsel."

In a letter to Edelstein, chief counsel for the government Raymond Carlson wrote that IBM's writ is a "transparent attempt to reargue the court's decision . . . and as yet another attempt to delay access by plaintiff and the court to statistical evidence relevant to the issue of IBM's monopoly power in the systems market."

HIS Boosts Upkeep Prices

WALTHAM, Mass. — Honeywell Information Systems, Inc. will increase maintenance prices by 6% to 15% and software license fees by an average of 5% on most of its computer systems.

In addition, the firm announced hikes of 2% to 7% in monthly rental prices as well as a 7% increase in the purchase price of selected computer equipment.

With minor exceptions, Series 60 rental and purchase prices were unaffected by the price changes, which took effect on Sept. 30 for new customers. Adjustments for equipment under existing contracts will become effective Jan. 1, according to a spokeswoman.

To illustrate the changes, the spokeswoman compared old and new prices on a Model 2020 with 32K words of memory, a 450 line/min printer, a card reader/punch and a disk subsystem with 9.2 million characters of storage. The contract maintenance price on this system rose 9% — from $904/mo to $985/mo; the purchase price remained unchanged and the rental price on a five-year lease increased 5%, from $2,726 to $2,862, she explained.

Similarly, for a Level 62 system configured with 224K bytes of memory, the maximum CPU performance level module, a 1,200 line/min printer and 480 million bytes of on-line disk storage, the five-year rental cost rose 2% from $6,966 to $7,017 per month, the purchase price remained unchanged and the maintenance on a purchased system rose 9% from $1,393 to $1,573 a month, she said.

Fees for systems engineering and selected education services also were increased an average of 8% while prices for data network services were raised 9%, the spokeswoman added.

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Despite Onslaught of Data Banking

UK Laws Hit as Inadequate Privacy Protection

By Joseph Hanlon
Special to CW

LONDON — "British law is inadequate to protect privacy," the National Council for Civil Liberties (NCCL) warned in a report entitled "Privacy: The Information Gatherers," published here recently.

Although privacy has been an issue in Britain for the last decade, the record "is one of almost total inaction," the report lamented. "The United Kingdom has fallen behind most Western countries in protecting individual privacy."

The report catalogs a series of new computer data banks and data exchanges that have been set up during the past 10 years. Although data banking in Britain is far behind that in the U.S., it is catching up; there are now a national police computer, a national driver and vehicle license computer and, in a limited form, computerized records of all hospital admissions.

In addition, a computer data bank was set up last year that will eventually contain the immunization and school health records of every child.

In Britain, even TV owners must have a license, and that file is also computerized: it is automatically correlated with a computerized list of households and letters are automatically sent to every household without a TV license inquiring why it does not have one.

Local governments are increasingly computerizing their records and the NCCL report cited recommendations from the Local Authorities Management Service and Computer Commitee (Lamsac) suggesting local governments set up data banks of people with link numbers so different records about the same person can be matched up. Lamsac recommended whoever inputs data should also regulate its use. But the NCCL warned that "although it is possible to 'code' the system so that, for instance, only the social workers responsible for a particular family can see the printout of a family's record, it is hard to believe that other officials — for instance, housing officials making a decision about housing allocation — will, if the decision is left to them, resist the temptation to have comprehensive information about that family. The point is that the decision must not be left to them."

The report also looked at medical records and noted that "in the absence of any statutory safeguards, some doctors also fear that computerized medical data could be linked with social service, criminal or other records and used for political or other purposes which the doctor and patient have no control over.

"Since the police already ask general practitioners to inform them about patients who may be police suspects, the danger of a complete linking of medical and criminal records is not remote," the report pointed out.

Although the report warned that "computerization does change the scale of the problem," it argued that "the threat to individual privacy posed by data banks does not, in essence, change if the information is computerized instead of being stored in filing cabinets."

Thus the NCCL objected to the UK government's decision to restrict its Data Protection Committee to considering only computer data banks.

The report concluded with the NCCL's new 10-point Charter of Fair Information Practice, which draws heavily on U.S. experience in its requirements that:

- No personal data bank must be secret.
- Individuals should have the right to see, challenge and correct their own files.
- There should be legal controls on the way information is collected.
- Information collected should be relevant and the minimum needed.
- Information given for one purpose should not be used for another without the data subject's knowledge and consent.
- There must be legal restrictions on the linkage of personal record systems.
- Transfer of personal information abroad must be controlled.
- Codes of practice should be developed for all those involved in collecting and storing personal information.
- The law should guarantee the individual's right to privacy.
- A data protection authority should be established to supervise collection and storage of personal information.

UK Groups Urge Licensing Of Data Users, Not Bases

LONDON — The Users of personal data, rather than the processors, should be licensed, according to a policy statement issued late last month by three British computer groups, the British Computer Society, the Computing Services Association and the Data Processing Management Association.

The British government's Data Protection Committee is currently meeting to decide between two ways of controlling data banks: some system of licensing, as favored by privacy advocates; or an ombudsman to investigate complaints, as favored by civil servants.

The computer groups have come down hard in favor of the first approach on the grounds "that the public will find a licensing authority the more reassuring of the two."

The suggestion that the users of data, rather than the data banks themselves, should be licensed has provoked interest in privacy circles here. The groups argue that "the ease of collecting data makes effective control extremely cumbersome and difficult" and that, in turn, "facilitates evasion of controls."

For example, a service bureau or time-sharing service may be maintaining a data base for a commercial user without even knowing it.

"Any work that involves the use of personal data files carries with it a potential breach of privacy and the public may reasonably expect that such work is carried out under controlled conditions," the groups noted. They proposed that there should be a statutory licensing authority, independent of government.

This body would grant licenses for specific uses of personal data and specify a "sensitivity level." Then it would grant certificates to computer agencies and operators, permitting them to work on data up to a stated sensitivity level.

This form of licensing "provides intrinsic protection against unauthorized new applications, for instance the correlation of existing files that were not previously part of the same application. It provides protection regardless of where the work is done. And, above all, such control is enforceable."

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Nov. 14-16, Chicago — **Distributed Data Processing,** sponsored by the American Institute of Industrial Engineers (AIIE), Contact: Department PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Nov. 15-17, Arlington, Texas — **Sixth Annual Meeting of Computer-Aided Manufacturing-International, Inc. (CAM—I).** Contact: C.H. Link, Executive Secretary and General Manager of CAM-I, Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

Nov. 16-18, Chicago — **Distributed System Design,** sponsored by the American Institute of Industrial Engineers (AIIE), Contact: Department PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Nov. 16-18, Montreal — **International Society for Mini- and Microcomputers (Mimi) '77.** Contact: Prof. J.L. Houle, Mimi '77, Ecole Polytechnique, Case Postale 6079, Succarsale A, Montreal, Quebec, Canada H3C 3A7.

Nov. 17-18, Montreal — **Canadian Association of Data Processing Service Organizations** (Cadapso) Annual General Meeting and Industry Conference. Contact: Cadapso, 299 Waverley St., Ottawa, Ont., Canada K2P OW1.

Courts Tell Users: Burroughs Contract Ironclad

By Molly Upton
CW Staff

Two unhappy Burroughs users have learned to their dismay that a well-written sales contract can protect the vendor like a coat of armor.

The bad news came in two court rulings that found the limited warranty clause in the Burroughs Corp. sales contract protects the vendor from a user's attempt to sue based on a salesman's promises and warranties, express or implied.

The cases were brought by Byrd Tractor, Inc. of Manassas, Va., in the District Court of Virginia, Alexandria Division, and by Westfield Chemical Corp. of Westfield, Mass., in the Hampden County (Mass.) Superior Court.

Byrd charged breaches of express and implied warranties associated with a second-hand L5000 accounting computer which, after an 11-month installation, it asked Burroughs to remove.

Westfield sued Burroughs for breach of contract, breach of warranty, fraud and negligence in the manufacture, sale and servicing of an L3000. It charged that promised savings of man-hours never materialized and, in fact, machine operation took more time than the manual procedure.

Key Clauses

The Burroughs contract contained two key clauses, the courts found. First, it stated: "there are no understandings, agreements, representations, warranties, express or implied including any regarding merchantability or fitness for a particular purpose, not specified herein, respecting this contract or the material or services hereunder.

"This agreement states the entire obligation of Burroughs in connection with this transaction.

"It must be understood that you assume full responsibility for the overall effectiveness in which Burroughs equipment and software are to function, as well as responsibility for the cooperation of your personnel," the Burroughs contract stated.

"Once an order is placed for Burroughs equipment, such order will not be subject to cancellation by the purchaser due to any of the matters which are purchaser's responsibility."

The second provision limited damages. It stated: "purchaser hereby expressly waives all damages whether direct, incidental or consequential."

Summary Judgment

In the Westfield case, Judge John M. Greaney agreed the contract precluded any claims on Burroughs and granted the defendant's motion of summary judgment, thus dismissing the case.

The disclaimers in the contract were effective to "disclaim all warranties, express or implied," including those alleged indications that the system would be appropriate for an accounting system, the judge said.

Burroughs' sole commitment to Westfield was to deliver, install and service the equipment as promptly as reasonably possible, according to the "Computer Law and Tax Report," (CLTR).

Burroughs was not responsible for any delay "nor for anything more than exchanging the equipment under the warranty (if Burroughs agreed to the exchange in writing," CLTR said.

In declaring the liability limitation valid, Greaney said the contract was "between businessmen acting at presumed arm's length." The limited remedy of returning defective parts was sufficient, he said.

What about the vendor claim, made during the preliminary planning stage, that the system would save man-hours. The judge ruled this was a representation of future performance, which is "not susceptible of actual knowledge and cannot serve as a basis of recovery in fraud."

He cited another case that ruled "when a representation relates to a matter not susceptible of personal knowledge, it cannot be considered as anything more than a strong expression of opinion, notwithstanding it is made positively and as of the maker's own knowledge."

Before such a matter can be submitted to a jury, the plaintiff must show the maker knew the statement was in some respect untrue, the ruling in Harris vs. Delco Products, Inc. stated.

Furthermore, since the user knows the vendor "cannot actually know what the fact of the matter is," he is not justified in relying on "the opinion of the speaker," Greaney said.

Also, Greaney observed, Burroughs had protected itself in the proposal by including a statement that the proposal was only preliminary and "the order when issued shall constitute the only legally binding commitment of the parties."

The judge pointed out four points frequently overlooked by users when negotiating contracts with suppliers:

- "The breach of warranty claim failed because there was a complete, conspicuous and valid disclaimer."
- The breach of contract claim failed because the limitation of damage clause in the contract was valid and enforceable, and Westfield didn't claim it was breached.
- The fraud claim failed because the indication of man hour savings was a matter of opinion, estimate or judgement and not susceptible of exact knowledge.
- Finally, the negligent manufacture claim failed since it is essentially a duplicate of the warranty and contract claims.

How to train your COBOL programmers in structured programming for $15 per student

When it comes to structured programming, the trainer's or manager's problem is twofold. First, he must decide which of the several methods of structured programming to teach. Second, he must decide how to teach the method. Up till now, neither decision has been easy, and it's little wonder that training in structured programming has been largely ineffective.

Now, I'm happy to announce a book by Paul Noll called *Structured Programming for the COBOL Programmer*. In my opinion, this book makes a major contribution to programmer productivity, because it does two things that haven't been done before. First, it presents a method for using structured programming that is complete, consistent, and practical. Second, it presents this method in a way that is educationally effective. In short, as you will see later, we guarantee that a programmer can learn to develop structured programs using the book alone. And that a programmer's productivity will increase as a result of this training.

Why Paul's Method Is Effective

It's not so much that Paul Noll has created a new method for using structured programming. It's more that he has refined and coordinated existing methods into a complete and workable system.

For instance, Paul uses IBM's HIPO for documenting his structured programs. Because IBM's implementation of HIPO is so cumbersome, however, he has developed his own HIPO subset . . . one that is easy to use.

Similarly, Paul has no objection to some of the existing methods for designing programs. It's just, he says, that they don't go far enough. They don't tell what type of modules belong at what level of the structure chart; they don't present a practical system for numbering the modules; and they don't relate the modules in the structure charts to the COBOL paragraphs. Furthermore, no one book or course presents a complete system for developing structured programs that includes design, documentation, coding, and testing.

In contrast, Paul's method is complete. He starts by telling you in detail how to design programs using structure charts. Next, he shows you how to create HIPO diagrams for each of the modules in the chart using his HIPO subset. Then, he shows you how to code the structured program using structured COBOL. Here, you will see how each paragraph in the COBOL program relates to one module in the structure chart. Finally Paul shows you how to use top-down coding and testing to improve testing efficiency.

4 Reasons Why this Book Is Effective

1. This book was written by an expert from industry, Paul Noll. He has been a software specialist for a large company in San Francisco, and he is currently responsible for the training of 250 programmers. As a result, his programming methods are superb, and his teaching methods are effective.

2. Paul never presents theory without showing its application. In contrast to other books and courses, this book is based around the development of four different kinds of business programs. Once you see how Paul's method is applied in these programs, you will forever see the value of structured programming.

3. This book is designed specifically for the COBOL programmer. As a result, you will see all of the structured coding techniques in COBOL (and only COBOL). You will also see how design and documentation are related to the programming language used.

4. This book contains dozens of illustrations taken from all phases of structured programming. You'll see structure charts and HIPO diagrams for each of the four programs developed in this book, you'll see structured COBOL, program stubs, test plans, walkthrough agendas, and much more. In my experience these illustrations, more than any other factor, determine whether an EDP course is effective . . . and they are the missing ingredient in other structured programming books and courses.

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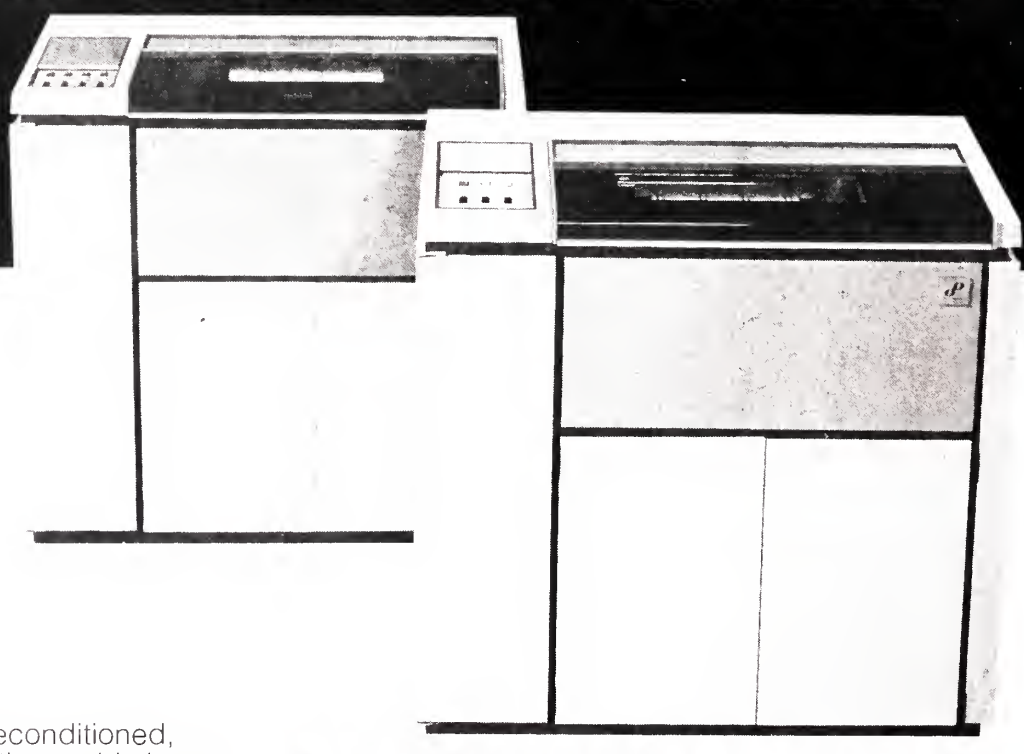

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Carter Asks EFT Use To Send Grant Monies

By Edith Holmes
CW Staff

WASHINGTON, D.C. — President Carter has asked federal agencies to use electronic fund transfers (EFT) to speed the payment of grant monies to state and local governments.

In a September 9 memo to agency heads, the President urged federal departments and administrations to work with the Department of the Treasury to identify grant programs that might be included in an EFT system — and particularly one that is being developed by Treasury as it extends its EFT capability for making payments to state and local governments.

"This is one way to reduce the occasions when grantees must spend their own money and wait for federal reimbursement," Carter said. "State and local governments should not be put in the position of having to lend the federal government money, which is, in effect, what happens when they must borrow money to pay bills while awaiting federal funds."

Federal grants to state and local governments currently total $72 billion each year, the President noted. The costs of inefficiencies and paperwork alone are "staggering," he added.

Carter included with EFT as methods of improving the timing of grant payments advance appropriations, letters of credit and labeling of checks so state and local officials know what programs the monies are to benefit.

"Several experimental [EFT] programs are now underway in, for example, the Department of Agriculture and the Department of Transportation," the President stated.

In addition to directing that EFT be used to help "modernize the way grant payments are made," Carter stressed the need for federal-state-local cooperation in the collection of information surrounding the giving and managing of grants.

"Agencies should establish cooperative data collection programs with state and local governments, wherever practical, to eliminate duplicative reporting of similar data by more than one level of government, so long as no legal prohibition against this exists," the President said.

The agencies must respond to the White House memo with proposed courses of action in these areas by Oct. 14.

Former Antitrust Official Not Sold on Bell's Stance

By Edith Holmes
CW Staff

WASHINGTON, D.C. — Philip L. Verveer, who left the Department of Justice recently after heading its AT&T Antitrust Group since November 1973 when the suit against the Bell system was filed, said he remains "unconvinced" about Attorney General Griffin Bell's potential approach to large structured antitrust cases.

The Attorney General, in an interview with *Fortune Magazine*, said he favored settling antitrust suits that involve restructuring of an economic system through congressional action rather than the decision of a single federal judge.

The remark led some observers here to conclude that Bell wasn't interested in pursuing the case as vigorously as those observers thought he should.

Verveer, who is taking a new post with the Federal Trade Commission's Bureau of Competition, noted he did not leave the Justice Department as a result of Bell's remarks. Rather, "some difference of opinion" with his superiors on how to properly approach the suit's discovery phase, involving the exchange of documents and files between the government and AT&T, led him to resign his position.

The lawyer has advocated the institution of effective case management procedures in the massive antitrust suit throughout his tenure at Justice.

Asked about the attorney general's proposals for such cases, however, Verveer said he believes the courts can manage these suits if they are handled correctly.

"We haven't got the right to be so pessimistic about the court system, particularly where the parties present the case properly and the judge controls the course of the suit," Verveer stated.

Beyond that, the legislature is always there as a last resort, he added, maintaining that this resort should not be institutionalized.

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A brochure giving further details on manuscript requirements, review procedure and other information may be obtained by writing to the conference chairman, Anthony Ralston, State University of New York at Buffalo, 4226 Ridge Lea Road, Amherst, N.Y. 14226.

Four copies of a manuscript, not longer than 2,500 words, with a short abstract of 100 words, should be sent by Dec. 15 to Stanley Winkler, c/o Association for Computing Machinery, 1133 Avenue of the Americas, New York, N.Y. 10036.

TRENDS AND APPLICATIONS 1978, National Bureau of Standards, Gaithersburg, Md., May 18.

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Three copies of a 1000-word abstrct should be sent by Jan. 15 to program chairman, Dr. Ashok Agrawala, Department of Computer Science, University of Maryland, College Park, Md. 20742.

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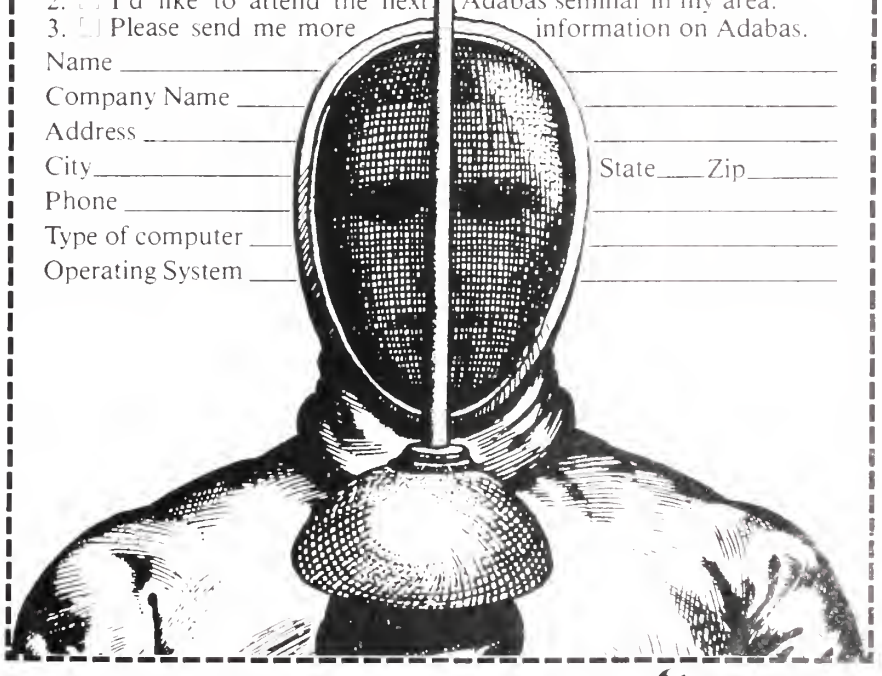

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Task Teams to Study Federal DP Revamp

By Edith Holmes
CW Staff

WASHINGTON, D.C. — President Carter's reorganization project plans to form 11 task teams and to rely on extensive public participation in its year-long study of federal data processing, the Office of Management and Budget (OMB) announced here recently.

Six of the task teams will address planning and management issues unique to individual federal agencies, OMB said in a memo to agency heads.

The five remaining teams will tackle those government issues common to all agencies, emphasizing in particular acquisition of computer and communications capability, the "discussion draft" of the federal DP reorganization study plant stated.

Appearing before the Federal ADP Users Group (Fadpug), Walter W. Haase, deputy associate director for information systems in OMB and manager for the President's reorganization project for DP, stressed that OMB is "still in the stage of formulating the study plan."

The reorganization project expects, however, to begin operation of two of the task teams by Oct. 15 and to initiate the other nine by Dec. 1, Haase said.

In addition, OMB is currently selecting people inside and outside the federal government to participate on the task teams, he stated.

When the teams are finally composed, 50% of their members will come from state and local government, universities and the private sector, the draft study plan explained. Approximately 52 people will be task team members, Haase noted, permitting the size of each team to be small.

Management Staff

OMB will establish a project management staff of seven people to coordinate the planning and execution of the reorganization study. This staff will consist of two representatives from the private sector, two from federal agencies and three from OMB, Haase said.

The project management staff will coordinate the development of the option papers that Carter will use next September to decide what legislative and reorganization changes federal DP needs. "The President, in all of the issue areas discussed, will be the decision maker," Haase said.

The hundreds of specific comments and suggestions received by OMB between mid-July and mid-August [CW, July 11] formed the basis for the reorganization project's selection of issues to be dealt with by the task teams, th OMB official stated.

The acquisition process, the planning, management and use of computers by program agencies and the policy guidance, regulation and control exercised by central policy agencies drew the greatest number of comments from public and federal agency participants, Haase said.

One of the two groups scheduled to start operation in mid-October, the acquisition task team will address issues pertaining to the selection of computational capacity to meet agency needs. Haase expects this group to deal specifically with the sources of supply of computer and communications equipment and services to the federal agencies.

Haase received a warm reaction from the users group when he expressed OMB's desire to shorten the span of time — now three to five years — it takes a federal agency to acquire a major computer system.

An operational management task team will address problems associated with systems design and the management of federal DP operations. Similar teams will work on computer and related telecommunications standards issues and on personal problems unique to the DP community.

The final team oriented toward governmentwide issues will handle "central policy issues, broad organizational issues and alternative strategies for meeting federal DP requirements in the future," Haase said.

Scheduled to operate from March 1 to May 30 and to tie together the findings of the other teams, this task force will deal with the central agency control exercised by OMB, the General Services Administration and the National Bureau of Standards over federal DP under the Brooks Act of 1965.

The task team addressing agency-specific issues in the human and community agencies (the Department of Health, Education and Welfare, the Department of Labor and the Veterans Administration) will also start up next month.

The other teams dealing with unique agency problems will cover computer and communications operations in the national security agencies, the small DP user agencies, the national resource agencies, the general government agencies and the scientific and technical agencies, Haase stated.

The public will be asked to comment on the project's findings between May and July of next year, he added.

ZBB an Opportunity

The OMB official suggested that the introduction of zero-base budgeting (ZBB) for all federal programs provides an opportunity to develop "more meaningful analyses and justifications" for the use of computer and communication technologies.

FTC to Investigate Credit Bureau Data

WASHINGTON, D.C. — The Federal Trade Commission (FTC) has voted unanimously to begin a limited inquiry into the accuracy of information collected and disseminated by automated credit bureaus.

The inquiry will try to find out whether credit bureaus have reasonable procedures to assure the maximum possible accuracy of the information they collect on individuals, an FTC spokesman said.

Depending on the outcome of this inquiry, the commission will determine whether further action is needed to enforce the Fair Credit Reporting Act on a nationwide basis.

Commission policy prevents this investigation from being made public, the spokesman stated, adding that the existence of the inquiry doesn't imply that credit bureaus are violating the law.

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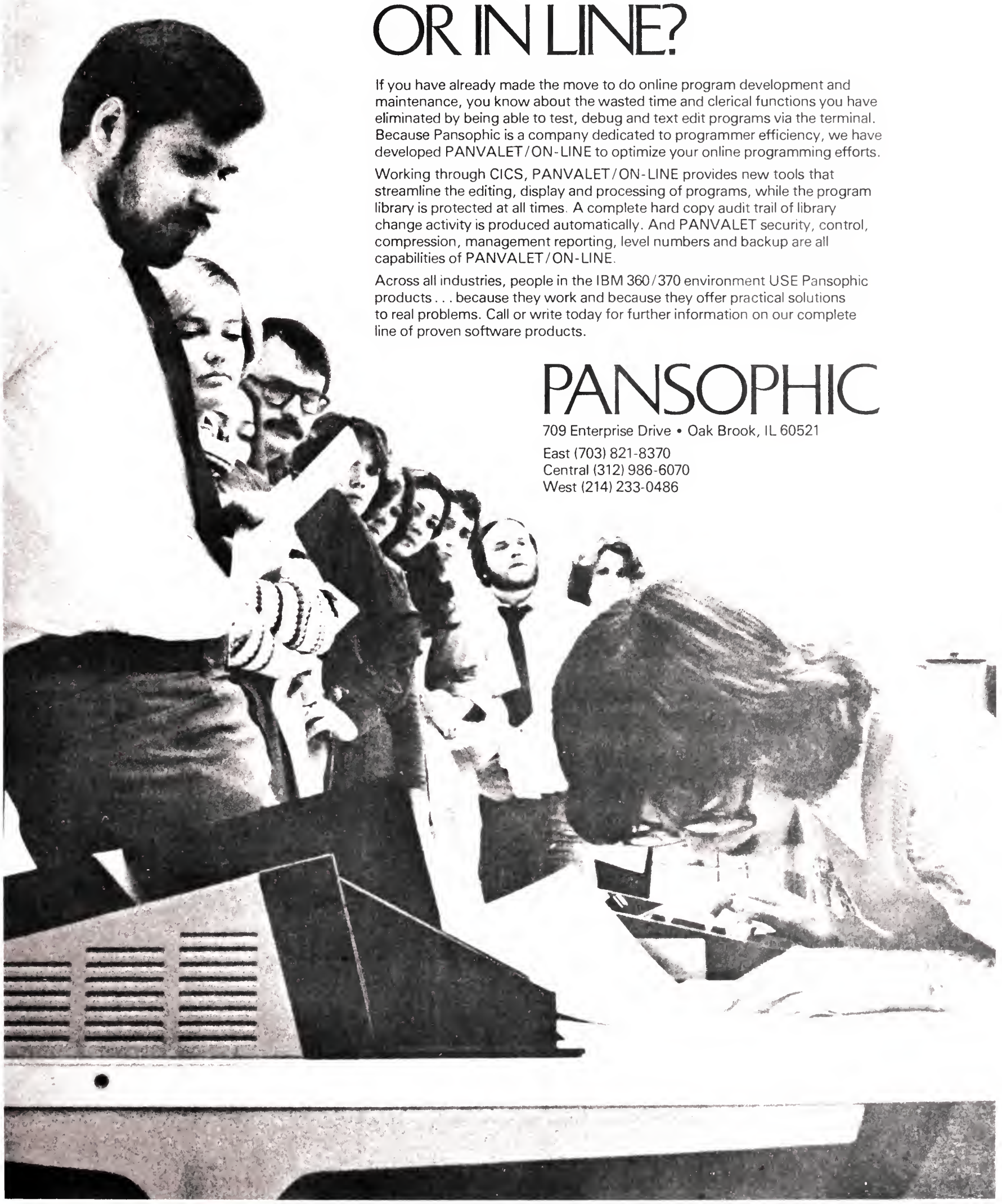

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Some Flood-Hit DP Sites Lucky, Others Not

By Ann Dooley
CW Staff

KANSAS CITY, Mo. — DPers had to struggle to keep their heads above water in the battle to save computer equipment endangered by flash flooding here recently.

While some installations were destroyed by water damage, others managed to save their computer equipment before the water could damage it.

One installation, Midwest Pre-Cote Co., a construction firm that builds roads and parking lots and repairs streets, saved all its equipment, moved it off-site and was back in operation two days after the flood sruck.

Allen Watkins, DP manager, was notified shortly after the flooding began that Pre-Cote's computer equipment might be in danger. "From then on, havoc set in," Watkins recalled.

"When I reached the building at 1:30 a.m., the water wasn't inside yet and we began to move files, card stock and everything else we could find to the second floor or at least desk-top high," he said.

Water 3 Feet High

By 3:30, when an IBM customer engineer arrived, the water was three feet high inside the building. All the power was shut off in order to avoid short circuiting.

At that time, the company's IBM 360/20 was still inside and in danger of being destroyed.

The system had to be torn apart and moved out of the building to save it.

The IBM engineer disconnected the cables from the machine and then attached wheels so it could be moved onto a truck.

The whole operation was done by flashlight and the IBM engineer had to dismantle everything by touch in at least one foot of water, Watkins said.

Although the moving truck had some difficulty getting through the flooded area, all the equipment finally was loaded and moved to a safer place. By the time the equipment finally was moved, the water was "hip high."

No Light Load

The print unit and attachment, which weighed approximately 1,460 pounds, and the CPU, weighing about 800 pounds, didn't make it an easy job, Watkins said.

When the equipment was returned two days later, some water damage was found and fans were used to dry out excess moisture.

In addition, all the connecting cables had to be cleaned and the machines repositioned and dried out so no shortages would occur.

"Three days after the flood, you could hardly tell it had hit us," Watkins said.

Pre-Cote's DP staff worked overtime to catch up on applications such as payroll for the 300 employees, accounts receivable, accounts payable and depreciation. But everything is still not up to date, and "it will probably take two weeks to get everything really back to normal," Watkins said.

"IBM really came through and got us up and running," he added. "I can't speak highly enough of them."

Bank Less Lucky

Plaza Savings Association was less fortunate in surviving the flood. Loocated in the Country Club Plaza shopping area, the area hardest hit, Plaza Savings lost its IBM 3600 consisting of eight terminals and a controller.

Four or five IBM 3604s were destroyed after the six feet of water swept into the bank, according to Jo Harris, assistant controller.

The flood, which hit the main office, also took down a whole loop of branch offices as well as the central site. But within two days IBM replaced the leased equipment by chartering a plane to fly in new equipment, Harris said.

"IBM's service was excellent," he said.

Now operating out of a branch office until the headquarters can be repaired, at least computer operations are back to normal, he said.

The flood which was so severe experts estimated it would happen only once every five hundred years, killed at least 19 people.

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Software Scene 'Diseased' But No Cures Near: King

By Don Leavitt
CW Staff

CHICAGO — "Whatever other adjectives one would wish to apply to the software scene, 'diseased' is certainly appropriate," according to David King, president of Infotech International of Los Angeles.

The state of software design is not yet at the point that one can start prescribing cures for whatever ails it, he told the Eighth Annual Professional Training Conference at the Marriott-O'Hare Hotel here recently.

But, he added, it might be possible to define what its state of health ought to be.

"That would be like trying to play the role of a doctor at a time when medicine is almost totally undeveloped," he remarked at the meeting, which was sponsored by Advanced Systems, Inc.

Intangibility Good and Bad

Because it is intangible, software offers both good and bad features, King noted. Among the good things, he said, is the fact that there is no material degradation and no hidden properties that might affect its production. By contrast, there are electrolytic effects in the production of electronic devices.

But, he warned the DP trainers, no material constraints have been placed upon software design, and that becomes a bad feature when combined with the fact that, to the users, the design and structure of a software package are virtually invisible.

"That provides an opportunity — if you can call it that — for the designer to misbehave grossly," King said. If a software development effort, "you can get away with a standard of design, at least locally and microscopically, which really would not pass muster for a moment in an automobile, a bridge or anything like that."

Correct Before Efficient

A healthy software development team would start by producing a program that is correct and then transform it into one that is efficient, instead of the other way around, the publisher noted. Most programmers work to produce a program that is efficient and then they enter into the stage known as debugging, in which they try to transform that efficient program into a correct one, he explained.

That situation has led to many of the functional-decomposition methods which have been developed in the past decade. But for the most part, they still lack the constraints needed to produce a correct design and a model on which the design — not the program — can be tested, King added.

The function-decomposition approach won't really solve the problem, he contended, since "the function is not fundamental; it is the model that is fundamental," and designers must create it first.

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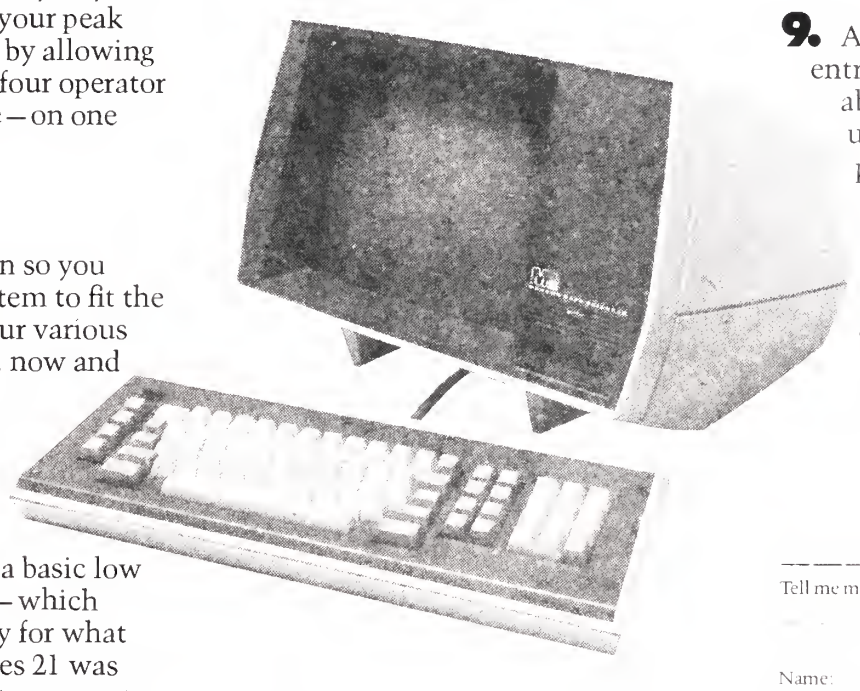

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Braniff System Speeds Ticket-by-Mail Delivery

By Jeffry Beeler
CW Staff

DALLAS — Braniff International and the U.S. Postal Service have applied at least some of the elements of an electronic mail network to an experimental ticket-processing system that has been undergoing tests here since Aug. 12.

The ticket-by-mail system, which Braniff officials claim is the first of its kind in the airlines business, is built around the company's existing flight reservations computer, an IBM 2314 disk drive unit and a teleprinter at the Dallas Post Office.

When a customer reserves a flight at Braniff's Love Field office and asks to receive his ticket by mail, a clerk enters the necessary reservations data through an on-line terminal into the airline's 1M-byte IBM 360/65 mainframe, which sends the information to the post office.

There, a Di/An Controls, Inc. 8100 teleprinter generates the customer's ticket, which a postal employee stuffs into an open-windowed envelope for delivery in the next day's mail.

The main advantage of such a system is speedier ticket delivery, according to Lou Garcia, a Braniff vice-president. Within five minutes of the time a customer makes a reservation at the Braniff office here, the system can process a ticket and have it ready for mailing.

The usual lead time for customers who request their tickets by mail is several days, primarily because manual ticket delivery is a complicated procedure involving many clerical steps and several reservations officials, Garcia explained.

Although he said the system has performed "very nicely" during its first two weeks of tests, Garcia declined to speculate on the viability of the ticket-by-mail concept. Braniff officials supervising the tests will delay their evaluations and recommendations until all the results become available in mid-November, Garcia explained.

Even if the system does go into regular service, however, it will print tickets for only about 70 customers a day, "a relatively small percentage" of Braniff's total daily volume here, Garcia admitted.

Seattle Public Library Service Puts Researchers, Sources in Touch

By Robert L. Glass
Special to CW

SEATTLE — Somewhere up in the Seattle Public Library, there's a computer terminal chattering away, querying an information data base.

It's a new service, a pilot project. Seattle's library is one of a few public libraries across the country utilizing computer-assisted information services. Via this service, public users may obtain all references in a fairly broad information bank to a topic or set of topics on which they are doing research.

Say, for instance, that one is interested in information on the penguin and pelican populations in Paraguay. Feeding those topics into the information system would result in the printout of a bibliography of relevant references.

Terminal Location

Terminals to support the system are located in the science/business, education and history departments of the downtown library as well as at the Municipal Reference Library in Seattle Municipal Building. Management of the system is located in the history department because, according to department head Jean Coberly, she is the only librarian with background in computer-assisted information.

Similar systems have been tried or are being tried in a few other public locations across the country (their use in industry and the academic world are by now more commonplace). The San Francisco Bay areas libraries, for instance, pioneered the service three or four years ago via a National Science Foundation grant to Lockheed Aircraft Co.

A study of the usage showed that as long as it was free, it flourished, primarily with job — and school-related queries. But when a charge of $5-15 per query was instated, usage plummeted and has only gradually come back. A similar system in Brooklyn was recently discontinued because of its cost ($60,000 per year) and the New York City financial crunch.

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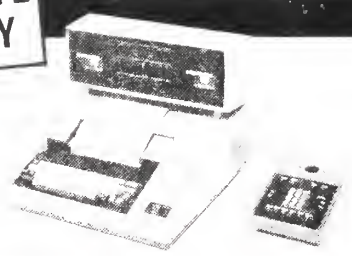

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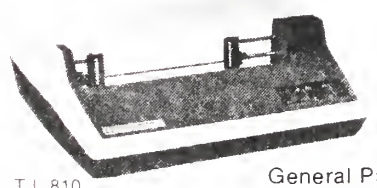

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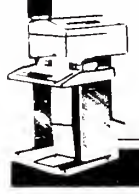

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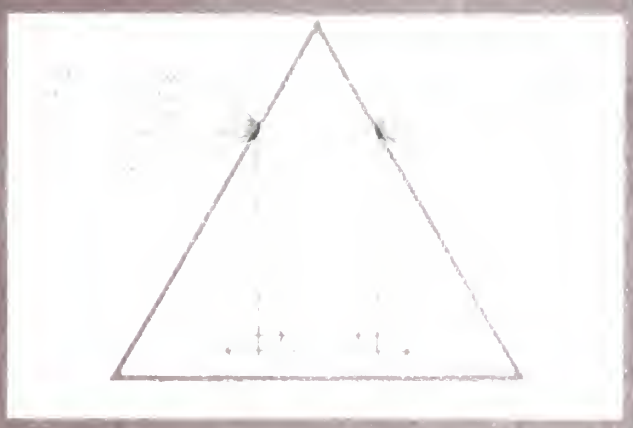

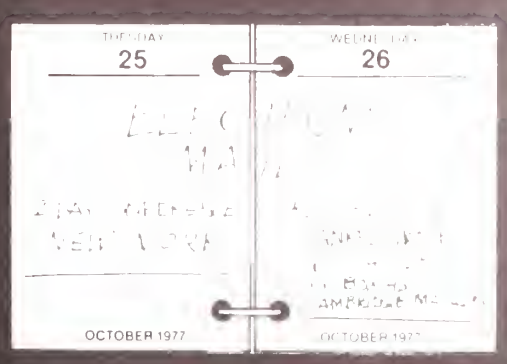

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Predicts Probability of Solution

Program Helping Police Budget Crime Time

By Ann Dooley
CW Staff

SAN DIEGO — 'The Streets of San Francisco" are kept free of crime and "Kojak" always catches the crook, but in real life the police don't solve all their cases because they are often too busy.

Investigators at the San Diego Police Department (SDPD) are assigned 30 new cases each day and only have time to investigate a few of them, so many crimes are never solved and the criminals go free.

But, the odds may soon change in favor of the police. A crime analysis program, developed by Lawrence Livermore Laboratory (LLL) and now being tested by the San Diego police, may help solve as many as 30% more crimes.

Predicts Solution

Given clues about a crime, the computer system is programmed to predict the probability of solving that crime. If there is a high probability of a solution, the investigator will follow it up; if not, he will pursue another case, Lt. Jack McQueeney of the SDPD explained.

The system is being tested on burglaries initially and ultimately will be used for all violent crimes.

Before developing the system, LLL researchers examined 100 crimes involving robbery, assault, burglary, rape and grand theft in the San Diego area. Testing with limited information such as the hour, the season and location of the crimes plus several other factors, the system proved 65% accurate in predicting whether the crimes had been solved..

Next, data on 700 burglaries was entered into the system. This information included the kind of residence or business where the crime took place, the burglary tools used, cash value of stolen property and data on witnesses, suspects and the get-away vehicle, as well as the area of the city and whether serialized property was taken.

With the additional information, the computer developed more significant patterns of data and predicted crime solution with 70% to 95% accuracy.

Previously, the decision to follow up on a case was made on an intuitive basis. Police sergeants who assigned cases to investigators were never sure if they were using the same set of criteria in assigning them or if they were using their own set of rules, McQueeney said.

Test Results Soon

The standardization of the decision process should increase reliability and allow an evaluation of the success rate, he said, adding the idea is not, however, to take the final judgment away from the police investigator.

Eventually the program will be used by investigators accessing the city's IBM 370/158 or be investigators in the field entering the data into hand held calculators, McQueeney said.

But right now, the system is being tested for efficiency and, most importantly, for accuracy. By the end of October, test results will be compiled to determine how the program's success rate compares with the success rate of investigators in the field solving the cases. If the recommendations of the computer differ from the solved crimes, further testing and additional variables will be added.

Will It Work?

It is critical to determine whether the system is predicting a crime can be solved when in reality the chances of solving it are small or, even worse, when it is indicating a crime cannot be solved when the chances for solution are good, McQueeney said.

There will probably be a debugging period to find out why there are discrepancies between the automated and human methods, but if all goes well the system should be operational by Nov. 1, according to McQueeney.

Now the SDPD has a success rate of 19% for solving crimes and with the possible 30% gain in crime solution the computer could provide, investigators will be solving more cases and at the same time solving them more quickly, McQueeney said.

The success prediction model and another system currently being developed will both be entered into SDPD's computer system, the Automated Regional Justice Information System (Arjis), which is being developed under a $2.5 million grant from the Justice Department's Law Enforcement Assistance Administration.

LLL, expert in "pattern recognition" techniques, also has created a system that could be used to predict time and location of crime waves, McQueeney said.

Using standard regression analysis techniques, the system can predict where, what season of the year and what hour of the day a crime will occur, according to McQueeney.

Crimes already committed are broken into areas or police beats and weekly time samples are compared with the yearly average in crime. The information can be graphically displayed on a CRT with a city map showing the month, day and season.

Once high crime times are predicted in an area, more police can be assigned to cover the spot. Eventually the crime area will be refined so it can be narrowed down to as small an area as one city block, McQueeney said.

User Suing NCR for $3.2 Million Receives January Date in Court

By Molly Upton
CW Staff

PITTSBURGH, Pa. — Jan. 9 has been set as the opening date in the case of Tri-State Engineering, Inc. vs. NCR Corp. in the Court of Common Pleas of Allegheny County.

Tri-State is seeking damages of $3.2 million in a suit charging NCR with breach of warranty, negligence and misrepresentation. An NCR spokesman said the firm declined to comment on current litigation.

The damages involve the cost of a Century 200 amounting to $322,075, a loss of about $1.5 million in profits, loss of service bureau business and the additional cost of borrowing, plus the costs of supporting the system with personnel and supplies and peripherals, according to Tri-State's attorney, Jack Plowman of Plowman and Spiegel.

The additional cost of borrowing stemmed from the fact that since Tri-State could not retrieve its financial statements from the system, it had to change its source of borrowing, Plowman explained.

Conversion Planned

Tri-State, a manufacturer of wire mesh containers for the material handling industry, operated a service bureau on its IBM 360/20 and intended to move all its internal and external DP operations over to the Century 200, according to Gary Graham, assistant to the president.

The firm installed the Century in August 1970 and attempted to run in parallel through about three quarters of 1972, he said.

The Century 200 is now in storage and is for sale, Plowman said. Graham indicated the firm now has a Univac 9600.

The complaint, filed in 1973, alleges the Century 200 was not merchantable. The suit focuses on hardware reliability problems, such as head crashes on the disk drive and problems with the card random access memory unit as well as with the printer and memory, Plowman said.

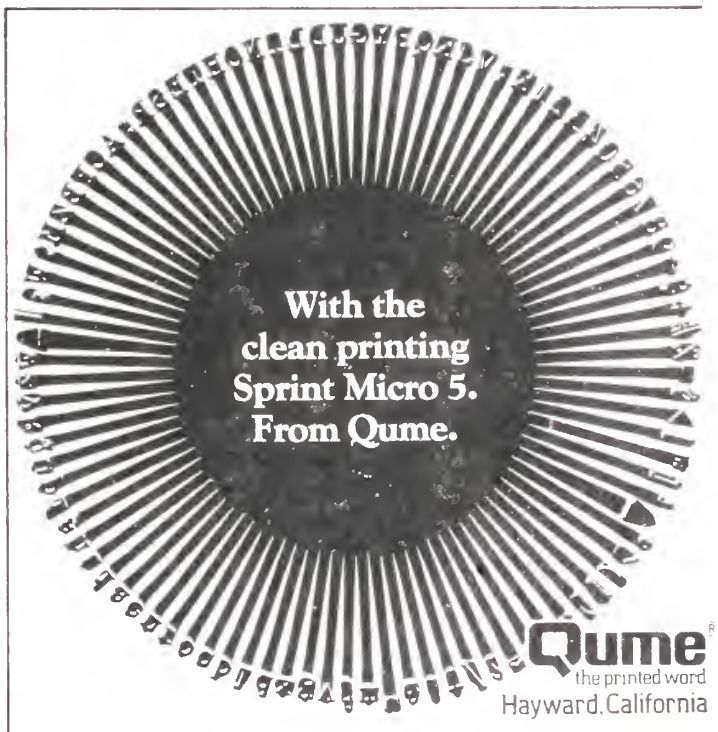
Furthermore, the complaint stated, the system was not "fit and sufficient for the purposes of Tri-State [and] would not operate properly within the temperature range of 60° to 100°F and a range of 28% to 88% relative humidity," as NCR had claimed.

Training Inadequate

NCR also failed to provide, as agreed, full and proper training of Tri-State personnel in the operation of the system as well as technical assistance necessary to apply the system to Tri-State's business, the complaint said.

NCR designed and manufactured the system in such a way as to permit it to "malfunction and issue incorrect information" which was not perceived by normal operational safeguards and checks, Tri-State said.

Also there was no adequate backup system to prevent the unintentional destruction of input, the complaint said.



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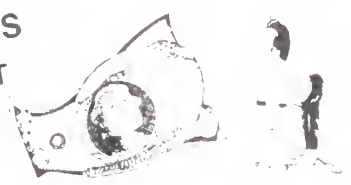

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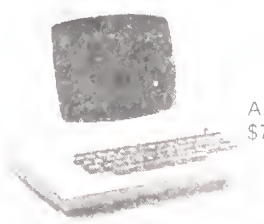

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Despite Improved Services

DDP Can Bring Organizational Conflict: Glaser

By Don Leavitt
CW Staff

LOS ANGELES — Despite a number of obvious benefits, distributed data processing may lead to various management concerns and organizational problems, according to George Glaser, president of Centigram Corp. and a past president of the American Federation of Information Processing Societies.

Won't life be easier when all the users are satisfied? Won t systems work better if input data is clean before it leaves the users' hands? Won't hardware costs go down as we supplant big (but inefficient and awkward) CPUs with new slick minis and micros? Yes, to all three questions, he told the annual meeting of the Society for Management Information Systems (SMIS). But there are hazards, he added.

Glaser noted it is "risky" to offer any definition for "distributed processing" but the usual idea is to move hardware out while keeping control cental. In general, distributed DP can improve the quality of services to the organization, he acknowledged.

In addition, costs for DP would be more visible and under better control, since they'd be in the functional unit's budget, "right where they belong," Glaser continued.

The hardware certainly exists now to support distributed processing, he said. In fact, "if you ask any DP manager how many minis his oganization already has, all you'll get will be silly smiles and nervous laughs," he said, amid a lot of silly smiles and nervous laughs.

In general, Glaser said he favors decentralization, but only when it does not conflict with the organization's goals. Hardware and software choices can now affect management philosophy, and software is the biggest stumbling block at the moment, he told the MIS directors. Many of the minis just don't have the software to manage files effectively if they were to be decentralized, he warned.

The centralization-decentalization decision is often as much a matter of luck as anything else, he said, but once the decision has been made to distribute the processing previously done in a central center, there are a whole lot of questions that demand answers.

Who, he asked, will set the direction for DP overall? Who will choose the hardware and software? Who will do the programming? And, who will set standards throughout the organization?

Perhaps most important, he added, is the question "who will decide all the 'who' questions?"

In fact, Glaser continued, top management must make the decisions and the DP technicians must be heard, but primarily in their roles as experts on available hardware and software. Clearly, DP management already in charge of a centralized operation "may have a bias" regarding the wisdom of breaking up its empire.

Worse Problems

All the classic management problems will be more severe if an organization decides to decentralize its DP. An organization that is highly centralized in all its other operations will find it difficult to decentralize; a highly decentralized organization will find it hard not to decentralize the DP operation, Glaser said.

The move, if it is made, has to take into account the conflicting or complementary authorities of the functional, technical staffs and the line managers. The first group is responsible for saying "do it this way" while the line staff has to say "do it now."

Ultimately, any activity is a delicate balancing of freedom and order.

On the one hand, freedom as illustrated by distributed processing is appealing — "but anarchy is not," he added. Order, perhaps represented by centralized operations, can be appealing, but carried to extremes it becomes bureaucracy, "which has no appeal," Glaser concluded.

DP Library to Assist Chemistry Students

HOBOKEN, N.J. — A computer resource library for problems relating to chemistry is being established at Stevens Institute of Technology here with a $24,700 grant from the National Science Foundation (NSF).

When completed next June, the system will make programs available to help students solve problems in general, analytical, organic and inorganic chemistry.

NSF support came through its Local Course Improvement Program.

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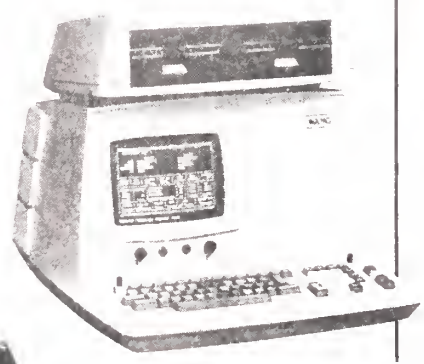

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Modern-Day Paul Bunyan

System Helps Feed, House Remote Workers

SEATTLE — If you've ever run out of food on a picnic, you can't help but wonder how one would go about feeding workers on oil rigs in the North Sea or at construction sites in remote corners of the earth for days and weeks at a time.

Universal Services, Inc., a firm specializing in food, housing and recreational facilities for contractors at such sites, does it with "computerized efficiency," according to George Hiddleston, founder and president of the firm.

Feeding and housing hundreds of such workers in the most unlikely places requires some of the ingenuity of Paul Bunyan and his acre-size frying pan, but they also take the backing of a sophisticated organization," Hiddleston added.

"We have a Honeywell computer to help us plan our menus and purchases in a very precise manner," he said. "We run menus through the computer, which then spits out the purchase orders. And it also helps us control inventory.

"Instead of having, say, $1 million in inventory floating around the globe, the computer can cut it by one-quarter and we do a better job," Hiddleston said.

The inventory and purchase applications initially were implemented in February 1976 on a Model 2020 computer that had been installed the previous fall. Because business has grown and computer applications are being added, the company installed a Honeywell Level 62 system last May.

According to Robert H. Pederson, Universal Services' director of information systems, "One warehouse in Alaska had a three-month inventory that we cut down to one month. Now we are hoping to get it down to two weeks. And we've also made dramatic improvements in our other two Alaskan and two Gulf of Mexico warehouses."

Location Size

The locations serviced by each distribution center generally range in size from five persons — geologists making summer surveys in tent camps in Alaska, for example — to the 500 men per camp on the Alaska Pipeline construction project. The typical camp size is about 50.

Food usage reports for all the camps served by a warehouse are compiled together on the computer. An average planning cycle consists of menus to feed 700 persons for eight months, Pederson said.

The computer then produces purchase orders from the menu data.

"The first set of orders is actually recommendations for our purchasing department," he said. "Purchasing reviews them and makes whatever changes are necessary, such as increasing certain quantities for a new contingent of workers or changing a vendor. Then final orders are printed and mailed.

"The computer handles some 1,200 items, most of which are ordered from about 25 vendors.

"It's more economical for our North Sea operation to order its goods directly from our Edinburgh and Aberdeen warehouses, so we handle only their accounting and reports here," Pederson said.

The DP department, which in addition to Pederson consists of one systems analyst/programmer, one operator and two keypunch operators, began conversion of the Model 2020 programs in December 1976 so they were ready to run when the Honeywell Level 62 system was installed in May of this year. There was no parallel operation of systems. Initial applications included accounts payable and receivable and general ledger in addition to the inventory. The department also installed a new Level 62 payroll system for handling about 600 checks per week.

The Level 62 configuration includes 96K words of main memory, 80 Mbytes of disk storage capacity, a 500 card/min card reader and a 400 line/min line printer.

"Next we plan to install some terminals in our accounting department, and one each in the Anchorage, New Orleans and Morgan City, La., warehouses so we can begin on-line operations sometime next year," Pederson said.

"On-line order entry should shorten the lead time by about a week — eliminating mailing time from the warehouse to Seattle and then the extra work of having another person keypunch them into the system," he said.

"We moved to the Level 62 because it offered us the most economic growth path — for moving to on-line systems and adding other applications as well as increasing capacity as the business grows."

Subzero Weather, Anyone?

NOVOSIBIRSK, USSR — Wanted: Programmers for Siberia. Must be able to withstand harsh living conditions.

Would such an advertisement ever tickle your fancy? If so, Soviet scientists compiling computerized profiles of successful settlers may make your dream come true.

The research to find people able to cope with the severe climate and conditions there is being carried on by the Siberian branch of the Soviet Academy of Medical Science, according to an Associated Press article.

It is part of what is described as an ambitious multidisciplinary research program on human adaptation which is being given a priority in Soviet medical science comparable with that given to cancer research in the U.S.

Observers estimate half of all Soviet workers who move to Siberia leave after three years, while one out of five depart within one year. Yet the area is rich in natural resources that require settlers to develop them. The computerized profiles may help the government select workers more suited for that climate, thus reducing turnover.

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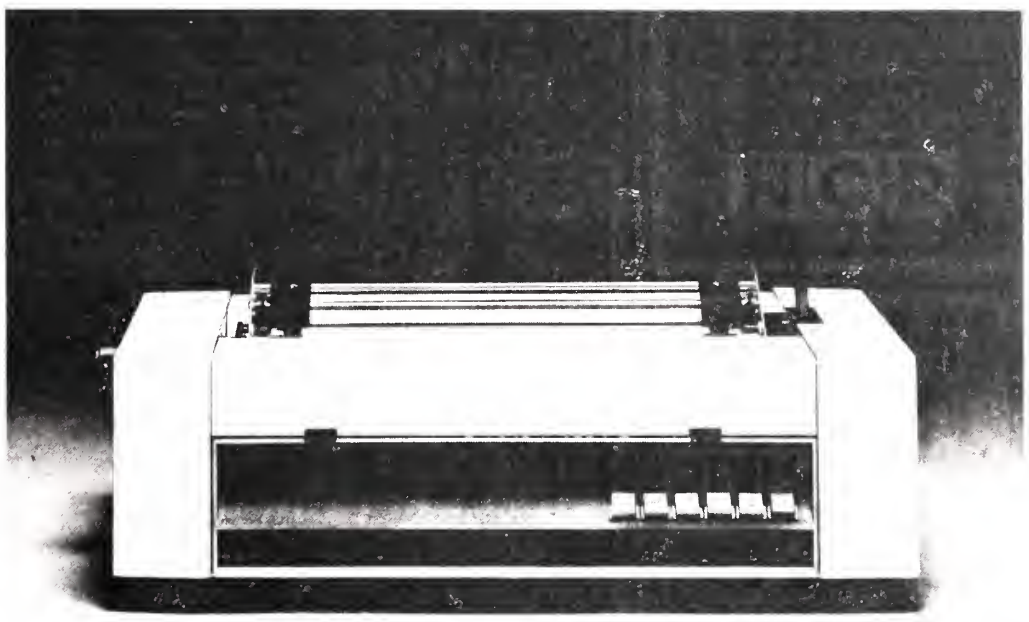

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Editorial

Attention: Micro Users

Microcomputers seem to be one of the current rages in computing today, yet the impact of micros is very difficult to assess. The questions "Who is using them?" and "What for?" largely remain unanswered.

If you are involved with user-programmable microcomputers, either professionally or as a hobbyist, take a few moments to help us answer these questions. The results of the survey will be published in a future issue of *Computerworld*.

Just fill out the form and return it to us in the prepaid envelope provided in this issue. Please mark "Editorial" on the outside of the envelope.

(1) What is your involvement with microcomputers?
( ) Hobby ( ) Profession ( ) Both

What types of applications do you use the micro for in your profession?
_____

(2) What is the approximate value of your system? $ _____

(3) Please describe your system. _____
_____

(4) What programming language are you currently using (or trying to use)?
_____

(5) How did you primarily acquire your system? (Check only one.)
( ) Computer store ( ) Electronics store
( ) Direct mail ( ) Club
( ) Other _____

(6) How would you best describe your system?
( ) Homebrew ( ) Turnkey
( ) Kit ( ) Preassembled
( ) Other _____

(7) If your system was a kit, does it operate? ( ) Yes ( ) No
If no, why not? _____
If no, do you expect to have it operating ( ) Yes ( ) No

(8) Please rate the following:

	Excellent	Good	Fair	Poor	Does Not Apply
Kit completeness	( )	( )	( )	( )	( )
Kit documentation	( )	( )	( )	( )	( )
Software documentation	( )	( )	( )	( )	( )
Operating documentation	( )	( )	( )	( )	( )
Manufacturer support	( )	( )	( )	( )	( )
Warranty	( )	( )	( )	( )	( )
System design	( )	( )	( )	( )	( )
System performance	( )	( )	( )	( )	( )
Delivery times	( )	( )	( )	( )	( )

(9) Do you own a programmable calculator? ( ) Yes ( ) No
If yes, what models? _____

(10) Are you involved with a local microcomputer club? ( ) Yes ( ) No

(11) Are you involved with a manufacturer's users group? ( ) Yes ( ) No

Name _____

Company (if nonhobbyist) _____

Address _____
_____

Data Past

Five Years Ago
Oct. 11, 1972

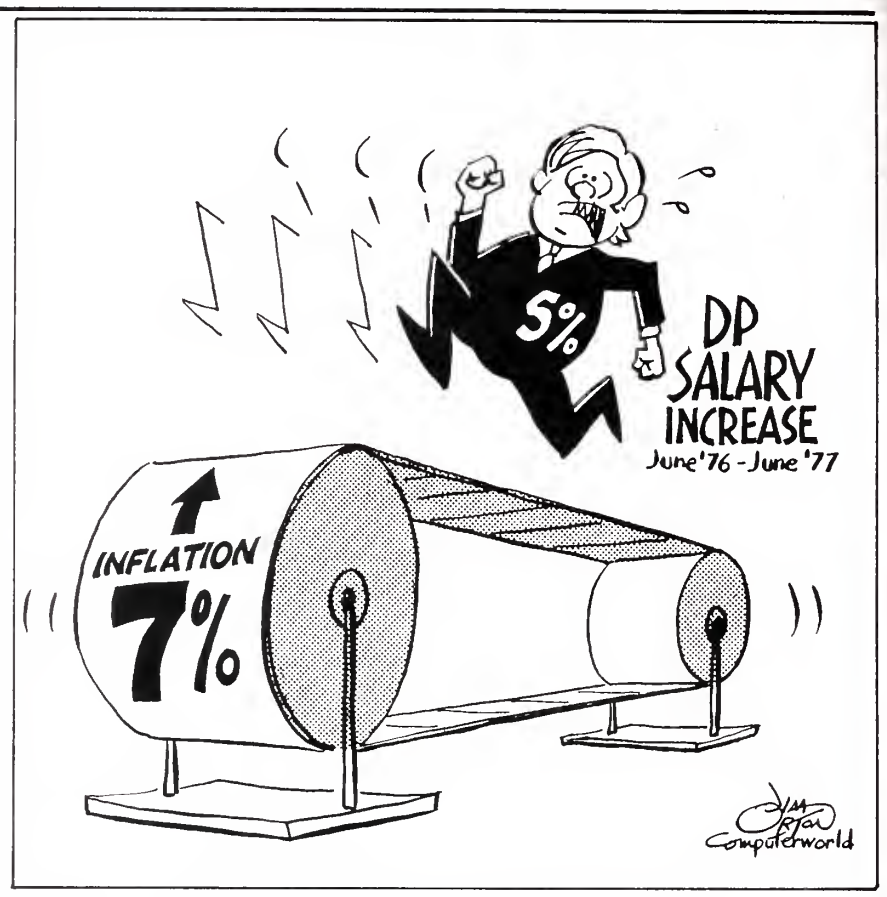
WHITE PLAINS, N.Y. — With the announcement of the IBM 370/125, users were able to get virtual memory capability on a 96K real-memory machine for the price of a 32K 360/30. The system continued IBM's trend toward bringing control devices for outside peripherals within the central processor and used independent "satellite" subprocessors to handle program instruction, I/O functions and system diagnostics.

Eight Years Ago
Oct. 15, 1969

WASHINGTON, D.C. — In an unexpected announcement, U.S. Commissioner of Patents William E. Schuyler Jr. told 400 attendees at the second annual Law of Software Conference in Washington that the Patent Office "would consider patent applications for computer programs on the basis of the merits of the specific inventions sought to be protected." This was a sharp reversal from the previous guidelines issued by the Patent Office which, Schuyler said, "discouraged the filing of applications on computer programs."

— — —

WASHINGTON, D.C. — The Internal Revenue Service released guidelines for the tax treatment of the cost of developing, buying or leasing software. The guidelines in Revenue Procedure 69-21 allowed users to either capitalize or expense software development costs.



'What I Need Is a Rearview Mirror!'

Letters to the Editor

Speculating on 3031, 3032

When IBM announces the 3031 and 3032, how will it treat the new wave of speculative orders?

IBM required credit checks and confirmation of credit resources before it would confirm "on-order positions" for company orders for machines for their own use or for leasing to others. Many of these companies extended the limit of their credit in order to confirm these orders.

Will IBM allow these speculative customers to cancel their on-order positions for 3033s and now switch to the 3031 and 3032 by placing new orders? Will it allow more speculative orders in the marketplace? Previously, IBM allowed speculators to take deliveries and put machines in warehouses for weeks to months until they were sold.

George S. McLaughlin
Summit, N.J.

Traffic Complexities

I would like to comment on your front-page article of Sept. 12 which suggested that substantial fuel savings can be achieved by replacing conventional stop lights with computerized traffic control systems.

First, the article was based on a report prepared by Honeywell, Inc., a manufacturer which could well benefit from increased use of computerized traffic control.

Second, urban traffic control is often so poor that any number of alternatives could provide substantial improvements. For example, in many areas of Los Angeles, synchronized traffic lights together with driver awareness of such synchronization could go a long way toward improving traffic flow and fuel economy.

Third, as a driver, I personally find unpredictable traffic lights infuriating; they make it much more difficult for me to optimize my car's gas mileage.

Finally, the use of data from existing traffic situations to generate traffic models ignore one of the most important variables in any traffic situation — the driver. The behavior of drivers can reasonably be expected to vary with the method of traffic control used.

Jay A. Sullivan
Agoura, Calif.

Programmer Tests Valid

I would like to take issue with Jack Wolfe's article, "Are Promising Programmers Slipping By?" [CW, Sept. 12]. I am not supporting total dependence on programmer aptitude tests, but I do think Wolfe's reasons for not using them were illogical.

In my opinion, he made two invalid assumptions. The first is that those persons who score well on timed tests do not work accurately and deliberately. The second is that those who don't score well on speed tests will work with greater precision.

It seems to me someone who scores well on one of these tests demonstrates the ability to be more precise, since he obviously answers more questions correctly.

I have never relied exclusively on a test score in selecting programmers, but an aptitude test is an added criterion in the hiring process when everything else is equal.

I have found that a small percentage of the "careful and deliberate" workers do become capable programmers, but they never perform as well as the "high-scoring" programmer with good work habits.

James W. Gordon
Columbia, S.C.

(Other letters on Page 27.)

Couger Richly Deserves Man-of-Year Prize

By Jack Stone
Special to CW

On Wednesday of this week, the Data Processing Management Association (DPMA) will confer its Computer Science Man-of-the-Year award on Dan Couger. In the nomination form for the award, Dan's supporters began the section on "qualifying contributions" as follows:

"In reviewing the qualifications of all previous recipients of [this] award, we believe our candidate has made a unique contribution — not just to the computer industry, but to American enterprise as a whole. Much more so than previous recipients, his efforts have been 'behind the scenes' — [and] therefore are especially deserving of national recognition.

"Dr. J. Daniel Couger has had more impact on the improvement in education for future managers than any other single individual in the U.S. For [two] decades, computer professionals have decried the lack of managerial involvement in the design of computer-based management information systems. [But] in only a small number of organizations has the desired level of involvement been achieved. An unspoken consensus is that we will have to wait for the next generation of enlightened managers. Dr. Couger's work has produced the environment necessary for that change."

Last month, during a break at a technical symposium in Washington, D.C., a tall, slender sandy-haired fellow outfitted in Western-style garb approached me saying, "Jack, I'm Dan Couger. We haven't met before, but I guess we both sort of write for the same newspaper, although you're slightly more verbose than I am."

"Well, since I couldn't make it as a double E, I'm taking a crack at freelance writing. In this way, I can yell at a whole population rather than one classroom of students at a time. Let's see now — you do some teaching at a college in the Southwest, don't you? Oh, and you publish some kind of annual hibliography, as I recollect. Wait — I have my standard question for academics: Just why haven't the universities done something, anything, to correct the abysmal lack of DP understanding among managers in U.S. industry?"

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

"Well, I think we've made some progress over the years. But it's going to be a while before the results are discernible. As a matter of fact, I've done some work in the area and have a familiarity with what's going on around the country. If you've got a few minutes, I'll try to fill you in."

When he had finished — the session ran for over an hour because I kept peppering him with questions — I simply went limp. First, I felt like an absolute jackass for drilling him with my preconceived conclusion about the absence of academic efforts. I was way off base.

Second, as we proceeded with our talk, it dawned on me that the enormous progress that has been made

The Human Connection

was sparked by *his* charisma, that the innovations which were so successfully introduced were *his* ideas (and, man, those university types sometimes can be really hard to move), that the curriculum design and materials were of his creation, that the trained faculty were *his* former students, and that the primary communication medium for DP in U.S. schools of business (plus untold numbers abroad) is *his Newsletter*.

Third, I was in the presence of the single most dedicated, sincere and hard-working person I have ever met, in or out of the industry, to say nothing of the intellect the man clearly possesses.

Fourth, I had talked with a man who has turned out extremely important work of immense quality, yet who did not evidence the vaguest notion of the meaning of the word "vanity."

To give you just one example of his consistent production, let me describe something of his Business Laboratory for Curriculum Innovation. The lab, located on the campus of the University of Colorado at Colorado Springs (UCCS), was developed as part of a massive curriculum development project that Dan headed. The project involved the structuring of detailed educational objectives in each of the subject areas for the UCCS School of Business undergraduate program.

He built a matrix of successive achievement levels — knowledge, understanding and skill — plotted against subject area.

The lab consists of these elements: The organizational behavior facility has a large lecture room, surrounded by four small rooms which may be observed by the professor through one-way glass, all for the study of group dynamics. There is a self-study section with individual stations where students can easily access a vast storehouse of audio-visual materials to acquire background concepts in all business subjects. (Dan has shown that computer concepts and principles, at least for college students, could be taught effectively through self-study and audio-visual modules. This allows the faculty to spend more time in class on advanced concepts.)

Last, but certainly not the least, is the computing complex with the works — time-sharing, remote batch, small business, programmable calc, you name it.

And what's more, students in the computer-based information systems field utilize all four laboratories. Now, that's progress!

Public Access to Public Systems Hindered

The Taylor Report
By Alan Taylor
CDP

Computer systems have some side effects which may turn out to be important — and which may just as likely turn out to be so ineffective as to be unimportant. A particular example of this is where one person has the right of access to the technology of part or all of a system.

In the past, this type of access was basically unimportant because some of the essential knowledge was really in a person's head and not on paper. Even if it was on paper, it could not economically be copied — or references were not able to be made or special equipment was needed. But in the computer age, these barriers no longer exist.

However, it is possible that others may be around which will just as effectively result in the unexpected restriction of access, just as much as the technology of the quill-pen days restricted access.

The matter is important to computer users for a number of reasons. In some cases it may involve them providing data — and in many more it may make valuable data available to them, without having to reinvent the wheel.

That is, provided that the rules for obtaining access to data are known. And here is the rub. So let's watch a case in action.

A computerized health delivery service has been developed over the past few years at the University of Vermont. While the updated details are not currently known, some of the data involved consists of 30,000 displays with vectors connecting them, according to the various rules, with further displays.

The function of these displays is to assist in diagnostic areas. If a person responds to a question on display A that he has trouble hearing, for example, the vector sends him over to display 583 rather than to display 1,257 for the next set of questions.

The amount of work involved in setting up medically correct displays and vectors is quite expensive and it is certainly not the type of thing for which reinventing the wheel is desirable. The work has been supported with tax money and seems to fall under Public Law 93-353, which has clear rules about data access by the public. This law reads:

"The Secretary shall.

"(A) Publish, make available and disseminate, promptly in understandable form and on as broad a basis as practicable, the results of health services research, demonstrations and evaluations undertaken and supported under sections 304 and 305;

"(B) Make available to the public data developed in such research demonstrations and evaluations and

"(C) Provide indexing, abstracting, translating, publishing and other services leading to a more effective and timely dissemination of information on health services research demonstrations and evaluations in health care delivery, to the general public.

Well, that is about as clear as any law can be, but it hasn't always worked in the past. The forms seem to clear just about everything in sight, but even final reports of projects were not getting into the files of the appropriate body, the National Center for Health Services Research.

When the General Accounting Office (GAO) investigated the situation over two years ago, it found that 17 out of 36 reports were found anywhere — and only 13 had ever been submitted to the center. Not a very good record, and one with which the center said it would deal.

James Wechsler, a deputy director of the center, was recently asked to tell me whether the data referenced in the GAO report — including the displays of the computerized system — had been made available.

At the time of the report, the reasons given for not providing the displays were:

- The documentation was written in computer language so only project people could understand it.
- The machines for which the displays were programmed were no longer in use.
- No [illegible] had been set up [illegible] project displays.

[illegible]

FBI's System Has Proved Its Worth

The following was originally sent to Donald Edwards, chairman of the House Judiciary Committee.

By Jerome J. Daunt
Special to CW

The article captioned "Study Questions Worth of NCIC" [CW, Sept. 12] utilized a "study" performed by the Scientists Institute for Public Information. The "study" amounted to one afternoon of interviews with FBI and National Crime Information Center (NCIC) personnel in an area in which the Scientists Institute for Public Information has no creditable experience.

According to the article, the "study" found that for such "a vast system, containing over six and one-half million records with 250,000 transactions per day, the 'hit' ratio was not demonstrated to be impressive."

It was stated, "The maintenance of the huge NCIC system, growing every year, may be subject to question when there is no demonstration that the 1,000 daily hits provide a significant benefit to law enforcement, and [when] comparable information may be available by other means, at cheaper cost and with less significant problems involving intergovernmental relations."

Reader Commentary

In the first place, the NCIC system is not limited to the FBI/NCIC computers in Washington, D.C. The NCIC system has over 55 computer interfaces with state and other federal law enforcement systems.

Furthermore, there are over 100 municipal, county and regional computer-based systems linked to the states and NCIC. In all, there are almost 30,000 remote terminals in local, state and federal law enforcement agencies linked to the NCIC system in a logical relationship.

Collectively, there are many, many times the number of records stored in these local and state computer-based systems than appear on the national file at NCIC. Obviously, the NCIC system is built on levels of information, namely local, state and national, which was the intent of the designers of 1966.

Furthermore, the comparison of 250,000 transactions a day is invalid in determining a "hit" ratio since many of those transactions are new record entries, cancellations of records or modifications of existing records.

Let's face it, 1,000 hits a day — positive responses resulting in the arrest of an offender, the recovery of stolen property and/or the solution of a crime — are impressive. The data stored in NCIC serves as a check against interstate mobility of wanted persons and movement of stolen property.

Collectively, many more hits are made daily in the related local, state and federal computer-based systems. NCIC data bases serve as a national index to complement state and local systems to counter interstate criminal mobility, which has been well documented over the years in Uniform Crime Reports.

Without a national index like NCIC, the local and state systems would be grossly inadequate.

Purpose of NCIC

It would be absurd to expect much more than a 2% hit ratio against a national index. Police make an inquiry on a person, license plate or other piece of property, and it should be understood that the vast majority of citizens are not wanted for a crime nor that the vehicle is stolen.

A "no record" response, however, is not useless information because it assists the officer in making a quick, intelligent decision to take no further action. The purpose of NCIC and its related systems has always been rapid response of accurate and pertinent information for law enforcement.

The "study" stated there is no demonstration that the 1,000 daily hits provide a significant benefit to law enforcement. History and experience have shown that, if a voluntary system like NCIC is not beneficial, then it will not be used.

On the contrary, NCIC use measured by daily transactions from local, state and federal agencies continues to increase dramatically. If the benefits were not significant, obviously the use of the system would remain static or, more reasonably, decline.

This alleged "study" suggested that comparable information may be available "by other means, at cheaper cost and with less significant problems involving intergovernmental relations." Law enforcement at all levels will not and should not give up control of its information.

With respect to "other means," there is no turning back from the benefits of computer-based technology. The latter has provided law enforcement with a capability of information and communication exchange that can make our traditional form of law enforcement responsibility work much better.

With regard to "significant problems involving intergovernmental relations," NCIC was planned, designed and implemented by municipal, county, state and federal law enforcement representatives in 1966. NCIC was the first computer-based system to link local, state and federal governments in 1967.

In scope, size, complexity and philosophy, NCIC is still a model for other intergovernmental systems. The law enforcement community obviously had no "significant problems" or it could not have achieved this success.

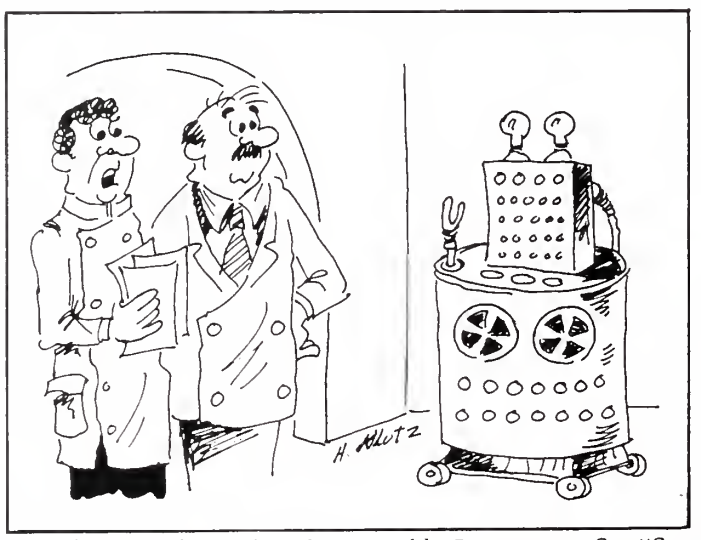
This is based on the fact that law enforcement at all levels of government has had a history of working together to reach national goals.

In conclusion, the NCIC system has proven cost-effective in eliminating the requirement for many thousands of police agencies to manually index information from outside their jurisdiction, saved police officers' lives, solved crimes across state lines, recovered stolen property across state lines and prevented felons from committing more crimes across state lines by early apprehension.

The cost of nationwide duplicate indexing alone more than justifies the cost benefits of NCIC. More important are the intangibles such as lives, prevention of additional crimes and reduced investigative costs due to the NCIC system.

Our way of life, namely local and state responsibility for law enforcement, demands the optimum use of computer technology as designed in the NCIC system.

Daunt is with User Systems, Inc. in Falls Church, Va.



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Letters to the Editor

The Real Purpose of DP

The CW editorial of Sept. 26, "Alternatives Growing," contained what I feel is a continuing misunderstanding about the role of DP in a corporation. Although the editorial focused on the expanding product offerings of OEM mainframes and peripherals, the reader was encouraged to investigate these alternatives "... because it should be the responsibility of all DP shops to look carefully at any method of possibly reducing costs."

I believe this objective is only half of the equation. The real purpose of DP is to improve the productivity of the corporation — simply measured as "output" divided by "input." DP affects output by implementing automated systems which make hundreds or thousands of bank tellers, claims processors, reservation clerks, etc. more productive in accomplishing the corporation's goals.

However, application system development in large DP installations has dwindled to a trickle of new systems. Computer programming is largely an individual craft and continues to defy managerial attempts to shape it into a measurable, controllable process.

You are right that "... DP operations are often criticized for their high costs." However, I believe you lead the DP director to the wrong conclusion. A "high cost" must be measured relative to the expected benefit. A $5 typewriter costs more than a $4 pencil; however, the output of the pencil makes its cost look enormous, while the typewriter at $5 is an outstanding price performer.

The point is, the criticism for high DP costs is a result of the generally poor performance of DP in delivering useful application systems.

But the DP director who is unable to increase or even maintain the "output," looks to the "input" half of the equation to try to rescue a sagging productivity ratio. "If I can cut my costs, then my productivity ratio will improve, and the corporation will think I've done well," the DP director hopes, and your editorial encourages.

This approach not only ignores the "output" half of the equation but focuses attention on the smallest piece of the "input" half. Hardware costs are less than 30% of most DP budgets and are expected to be only 10% by 1985. Swapping hardware around to save 10% has a net effect of only 3% on the DP budget today and will shrink to 1% in the future. However, a 10% productivity improvement in the systems and programming staff would be worth 7% of the DP budget today and 9% in the future.

While the DP director should be informed on the applicable product offerings of all vendors, your editorial places far too great an emphasis on cost reduction as the role of DP. All hardware products from all vendors continue to improve in performance at a reduction in cost.

Sooner or later, the DP director must face up to the real problem: No matter how far he cuts his hardware budget, until he begins to deliver new, useful application systems, he will continue to be called on the "corporate carpet" for "excessive costs."

Dale W. Saville
Charlotte, N.C.

A 'Dumb' Controversy

The Jeff Murphy's, Joe Rigo's and others akin in thought have been writing anticertification tripe for years, and *Computerworld* continues to print it. The pro- vs. anticertification controvesy is dumb. If you will allow an appropriate paraphrase to a tiresome subject: "Those who can, do — and become accredited; those who can't throw brickbats at those who can — by attacking accreditation.

The Certificate in Data Processing (CDP) and the Certificate in Computer Programming (CCP) testing procedures are not intended to "prove" competence where none exists, nor are they designed to "prove" any hot-shot bit-fiddler is moral.

Rather, they are an integral part of a program which allows those who would call themselves "professional" to demonstrate to all that they are not only competent but willing to be held responsible and accountable for their actions as professionals. 'Nuff said.

Robert R. Cromer
Dallas, Texas

SNA Misconceptions

The editorial of Sept. 5 on Systems Network Architecture (SNA) contains a number of misconceptions, both about SNA's design and its acceptance in the marketplace.

A substantial number of IBM customers in the U.S. are running production applications with SNA. Others are performing preproduction system tests. Of those with fully implemented SNA networks, most report they are achieving the performance and economic benefits they expected.

You suggest that SNA may be "ahead of its time." But it is vital that an architectural framework for the rapidly growing field of data communications look to the future — both to maintain flexibility to accommodate new technologies and to provide customers with a blueprint for long-range planning.

The actual implementation of such an architecture will necessarily be an evolving process, and SNA is designed specifically to incorporate change with little, if any, impact on customer applications. IBM has announced many enhancements to SNA during the past three years, and we expect to continue to do so.

Just as IBM's architecture for System 360 and System 370 made possible the orderly evolution of central processor operations, we believe SNA provides the flexibility to meet our customers' needs.

Terry R. Lautenbach
President
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IBM
White Plains, N.Y.

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COMPETITION	CULPRIT
Two input files maximum.	Handles up to 256 input files simultaneously.
Maximum six reports in a job stream.	Process up to 100 different reports simultaneously — each independent from the others.
Complex reports hard to code.	Same thought and coding efforts regardless of complexity.
Maximum 15 numeric fields automatically bucketed.	No limit to numeric fields that can be automatically bucketed.
Data exceptions stop runs.	Data exceptions caught and documented without aborting run.
Card order vital.	Card order not important, except for multiple file reports.
Limited headers. Titles on two lines maximum; column headings on three.	Can use as many as eight differently formatted header lines, which can double as title lines.
Bit fields hard to check; can't be referenced individually.	Bit fields easier, less confusing to handle. Report requestor can define bit strings at will.
Maximum 1128 bytes for working storage fields.	Can define work fields that use over 32,000 bytes for alphanumeric and 32,000 bytes for numeric work fields.
Numeric constants require overpunching.	Numeric constants coded easily (negative one codes as "- 1"). No multi - punching necessary.
Limited subscripting of work fields. Uses addresses not subscripts.	Can define workfield tables with limited numbers of table entries, and subscript or index through such workfields. Workfields can be numeric or alphanumeric.
No sorting with multiple-file reports.	Full sorting with multiple-file reports. Each report is independent and can use CULPRIT's full range.
Control (break) fields not quantitative.	Control fields can be quantitative or non-quantitative. Can be both workfields and input fields.

COMPETITION	CULPRIT
Fixed length sort. Entire input record is extracted.	Variable length sort for greater efficiency.
Match files. Designed more for file management than reporting. Producing reports against multiple input more complicated.	Retrieves information from multiple files simply. No added technical ability needed by requestor.
Database interface assumes much DBMS knowledge.	Interface models have been efficiently coded so non-experts can easily retrieve information.
Error diagnostics not complete or helpful.	Error diagnostics clearly indicate what action is needed to correct the parameter cards.
Cannot sort on workfields.	20 sort fields for any given report can be either workfields or input fields.
No descending sort.	Permits either ascending or descending sort for any sort field.

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General Warns SMIS:

Rigid Criteria Block MIS Effectiveness

By Don Leavitt
CW Staff

LOS ANGELES — Management information systems make it possible for individuals working in an organization to improve their productivity, but a large number of such systems do not provide the full measure of potential organizational productivity improvement of which they are capable, according to Major Gen. Jack L. Hancock.

The commanding general of the U.S. Army Computer Systems Command said he sees two primary reasons for this situation. First, many systems are based on "user requirements" which are not, in fact, the real requirements at all, but are just the requirements believed to be valid at the beginning of the design phase.

Second, he told a session at the recent Society for Management Information Systems (SMIS) conference here, after implementation when the user finds the original requirements were invalid or incomplete, he starts the systems into the "interminable repair, enhance and improve" mode of maintenance work "which is so costly and frustrating to all."

Current calls for better tools by which the designer can compensate for inadequately stated user requirements and for improved means by which the user can state his requirements clearly and consistently are important activities, Hancock said, "but they fail to attack the real problem."

That problem, he continued, is simply that the user is incapable of knowing his requirements "with the specificity that we, as designers, must have in the application of traditional design methodologies."

And that's not the users' fault. "Organizations today are so complex and their management so difficult, a manager cannot be expected to fully identify systems requirements at the outset of the design process . . . Decision making is probably more an art today than it was a half century ago."

It is little wonder the user responds in one of three ways when asked what he needs from a system, Hancock said. The answer is either "I don't know," "I need just what I get right now, but I need it to be more acurate and more timely" or "I need everything you can give me."

Even from such starts, "User requirements" can be developed including a well-planned long-range development program aimed at a modular improvement on an orderly basis. But such predefined requirements cannot cope with "those changes, almost extemporaneous in nature, which we are forced to make after implementation to either correct system deficiencies or make the system more responsive to the user."

Instead, Hancock recommended that designers particularly look at ways to improve the ability of the user to specify those requirements he believes to be valid early in the process, but to withold commitment to all other requirements until he in a position to validate them.

In effect, this approach shortens the feedback cycle so that changes can be made during development rather than after initial implementation. It also means the "wall" that has come between DP analysts and functional analysts has to be removed so the two specialties can again be integrated, he added.

Better Tools

But they need better tools, too, Babcock noted. Perhaps most importantly, these might include simulators by which users and designers could foresee the volume of work and the size of files that might be generated by initially proposed inputs, processing steps and output requirements.

Some work in this area is being done at Ohio State Universtiy and at the University of California, he acknowledged..

A "breadboard" approach, somewhat similar to traditional hardware breadboarding, might be useful too, he added, but the software breadboard he has in mind is quite different from older concepts that used the same name.

Hancock's breadboard would be a programming product developed with almost no thought to programming efficiency, computer runtime or cost effectiveness of the breadboard per se. Key modules in the system would be programmed in a language which may not even be the langauge ultimately used to produce the real system.

The breadboard work would be a quick-and-dirty effort designed to produce an operating model pattern after the user requirements, but the entire system need not be "breadboarded." The breadboard would not be a final specification and the user together, to certify the validity of the concept as a basis for producing final specifications.

Hancock stressed that the breadboard work would be "throw-away" code, displayed to the user so he could approve, disapprove or request changes. After all changes are made and the breadboard approved, it goes to the final design and programming team to be used in preparing final specifications and creating the production mode programs.

Decsystem-20 Users Can Build On-Line Code With 'Traffic-20'

MARLBOROUGH, Mass. — The Transaction Routing and Form Formatting In Cobol (Traffic-20) package from Digital Equipment Corp. is a collection of general purpose routines for developing on-line applications in a Decsystem-20 environment.

Using the communications capabilities of the Tops-20 operating system, users of Traffic-20 can access any local or remote terminal, he said, adding that Traffic-20 should be "ideal" for such tasks as data entry or order entry, inventory control, order processing or production control.

Traffic-20 consists of two subroutines. The Transaction Routing Routines (TRR-20) let user programs route transactions received from various terminals to the appropriate transaction processing jobs. The Transaction Formatting Routines (TFR-20) can be used to display predefined forms and to move data to and from the display.

In a TRR-20 operation, an order entry transaction may for example, involve routing and processing by three separate jobs; one that verifies the status of an existing order; a second that enters a new order (by accessing a customer file and a production file); and a third job that updates the new order and inventory files.

Traffic-20 requires 2.5K words of memory in addition to the user's application code. The software is available for $5,000 from DEC's Large Computer Group, 200 Forest St., Marlborough, Mass. 01752.

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MDS Uses PDMS to Boost Programmer Productivity

By Ernie Burnett
Special to CW

HERKIMER, N.Y. — Corporate data processing at Mohawk Data Sciences has "stretched" its DP dollars during 1977 by providing the programming staff with a tool to improve productivity.

With internal DP systems running on an IBM 360/65 under Extended Disk Operating System (Edos) from The Computer Software Co., it was only natural to be extremely interested in the Program Development and Maintenance System (PDMS) when it was made available from the same vendor.

PDMS utilizes, as its base, a very efficient Partitioned Data Set (PDS) library that never needs to be reorganized or condensed. Included in PDMS is powerful command structure that provides the normal backup restore and update plus the ability to transfer blocks of code from one PDS member to another and a sophisticated character string manipulation processor.

PDMS extended the programming systems support software by bringing source program maintenance, JCL maintenance and testing to the programmer via IBM 3270-type video display tubes. Not only does the system allow programmers to update programs and other card-image type members in a PDS library, but it allows direct interface to an enhanced assembler, ANS Cobol compiler and linkage editor which can also access the PDS library.

Working with the extended spooling facility of Edos, the programmer can enter jobs directly into the spooler and can capture printer or punch output for interrogation, recatalog as a new member from the output "Q" back into a PDS, or delete the data from the "Q." This direct interface with the spooler eliminates some of the trips between the programmer's work area and the computer room.

It should be obvious at this point that with our staff of 12 programmer/-analysts using five CRTs, we have greatly improved the responsiveness to our users and have provided much quicker turnaround for program and JCL maintenance. We have also been pleasantly surprised many times by the capabilities of this system.

For example, we were recently required to change the branch office number scheme in our Field Inventory System. This required putting the same new logic into 75 Cobol programs. Using our old IBM source library system, the job was, with one programmer, estimated at five weeks to get the changes in. Using the "Split-Screen" update of PDMS (upper half in display mode the lower half in conversational update mode) blocks of code were transferred directly from the top to the bottom of the screen and therefore into the program being updated.

It is difficult to put tangible dollar savings on this type of environment, but with emphasis being placed on making efficient use of existing resources, in this case programmer productivity, PDMS has improved our working environment, generated more interest and has proven to be an attractive price/performance product.

Burnett is manager of software support at Mohawk Data Sciences Corp.

'Syncsort' Found Most Popular

WALTHAM, Mass. — The Syncsort package from Whitlow Computer Systems, Inc. is now the most popular vendor-supplied sort on IBM OS and OS/VS systems in the U.S., according to a study conducted recently by International Data Corp. (IDC).

As of July 1, 1977, Syncsort was installed on 1,333 (or 43%) of the estimated 3,100 such computer systems in this country. Not included in the survey were sort users in other countries, where Whitlow claimed to have 300 more installations.

At the same time, the study estimated, IBM-supplied sort routines were installed in 1,643 or 53% of the U.S. OS and OS/VS sites. This overall total is made up of 992 sites that use IBM's 5740-SM1, 465 that use 5734-SM1 and an additional 186 still working with SM023.

The survey itself involved telephone interviews with 139 sites which were known to be using at least one IBM system operating under OS or OS/VS. Drawn from IDC's data file, this sample was considered large enough to provide a valid statistical base for any conclusions.

IDC's researchers successfully interviewed 132 computer sites which had a total of 201 IBM systems working in the target environments. Seven of the sites initially contacted declined to respond to the survey.

The direct results of the survey showed six sites that did not use any vendor-supplied sorting software. Of the remaining 195 CPUs, 84 used Syncsort; 62 worked with 5740-SM1; 29 had 5734-SM1; and 12 utilized SM023. Another eight used CA-Sort from Computer Associates.

By extension, IDC determined that about 100 of the 3,200 OS and OS/VS sites in the U.S. do not go to outside vendors for sorting support.

Copies of the report may be obtained from Whitlow Computer at 560 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Support Added To Control/IMS

SUNNYVALE, Calif. — The Control/IMS utilization and accounting system for IBM IMS/360 or IMS/-VS operations has been upgraded by Boole & Babbage, Inc. (B&B) to support IMS/VS Release 1.1.4. The added support is similar to what was introduced earlier for IMS/VS Release 1.3, according to a B&B spokesman.

To provide the backing needed for IMS/VS 1.1.4, nine modules were updated in Control/IMS: most of the changes were in the Vsam and Isam/-Osam buffer control modules, he added.

Cost of Control/IMS is $17,000 per site, B&B said from 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Two more high performance systems extend the new NCR 8000 series.

The NCR Interactive I-8430 and I-8230.

With these two new computer systems, NCR has now introduced six major current technology computer models in 1977. And there are still more to come.

These new systems offer more alternatives and greater productivity for many businesses and organizations. And NCR's migration path engineering offers unlimited growth potential. Because compatibility—protection against obsolescence or increasing volume—continues to be an essential feature of NCR system design. Every user can move up from the I-8230, the I-8430, or any other NCR I-8000 system.

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The I-8430 uses NCR's powerful IRX (Interactive Resource Executive) operating system, and functions in the virtual memory multiprogramming mode. IRX is an easy step up from IMOS III (Interactive Multiprogramming Operating System), the operating system used by NCR's I-8200 Series. No reprogramming; not even recompiling. And a step toward the Criterion Series. That is migration path engineering.

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The second new system is the NCR I-8230, a powerful and flexible minicomputer system designed for small-scale autotransaction applications. Or for use as a local processor in a distributed processor network.

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Monitor Helps Firm Tune Hardware, Software

LONDON, Ontario — Even with an IBM 370/168 VS system, the ability to ensure maximum performance and optimize resources is a prime concern at London Life Insurance Co. here, according to Ronald W. Murray, the company's senior technical analyst.

The company acquired the 370/168 in September 1973 because its workload had outstripped the capacity of its 360/50 and 360/65. Based on its operating history and present trend, the workload should continue to grow at a rate of 5% to 9% as the company expands into new insurance areas.

To ensure the system is operating at its peak and all resources are being properly allocated, Murray and his group run Boole & Babbage's Configuration Utilization Evaluator (CUE) software monitoring system every time a new application is added and at least once a month to "tune" the hardware.

"We use the monitor to assist us in isolating heavy page rate areas and to ensure they are being handled properly," he commented. "It also assists us in making certain we have fairly equal device utilization and proper placement of our data sets on particular volumes."

Murray noted proper channel utilization has been an area of key concern as well as a common source of problems for London Life. "Shortly after our system was on line and operating, we used CUE and, after studying the reports, we found our channels were out of balance by about 20%," he said. "After making some software adjustments, we were able to balance the channels and achieve much better throughput from the system."

Murray commented that visual monitoring of the system and its operation is extremely difficult because of the length of time necessary for observation before any determinations can be made.

However, with a good software monitor they are able to run the monitor on the system and receive condensed time reports to provide the objective overview statement.

The CPU and I/O overlap reports have been of considerable assistance to Murray's team because they let them see what is going on over the specific channels. He said that with only simple changes they have been making significant savings in this area by keeping the CPU use at its optimum and by reducing waiting periods. "We've found that it was easy to improve our efficiency by 10%," he commented.

In addition to handling hardware problems, the software monitor has assisted London Life by pointing out some of their software problems.

"In one instance, we had a particularly high average page service time per request, about 125 msec," he stated. "By studying the reports we could see where the problems occurred and, by tracing the software back against the reports, we located the specific program locations which were causing the problems. Then with a few very minor program rewrites, we eliminated the software bottleneck and were able to reduce our average service time per request down to 70 msec."

All in all, Murray estimated the software monitor has assisted his department in improving the system's efficiency by 15%.

"We've also found that channels, our need for direct access, and our volume activity during certain periods will dramatically affect the system's efficiency. If you don't keep on top of it constantly, your system's efficiency can drop by as much as 10% in less than a week.

"The IBM VS system has many overall and individual advantages for firms such as ours involved in a multitude of areas," Murray said, "but it requires a greater degree of sophisticated monitoring and measuring to ensure that it provides those advantages to us and our customers."

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'Surv02' Uses RPG-II to Run Survey Studies

PORTLAND, Ore. — Surv02 is the second generation of a market survey analysis program for use by nonsystems marketing researchers. Originally developed for Proctor & Gamble, it can be used on any CPU that supports RPG or RPG II, according to the current marketer, Centauri Corp.

The survey analysis is done by the software in accordance with control parameters entered by the researcher. As many as 99 separate analyses can be handled in a single run of the program and each analysis may be based on as many as 999 interviews, with up to 91 six-way multiple choice questions in each interview, the spokesman said.

The researcher shapes the report desired through three basic operations. First is the selection of interviews (from all the interviews in the survey file) to be used for the particular study. The criteria for selection may be as complex as need be, he added.

The second operation is the tallying, of the interviews selected, of actual responses of each type occurring for each question in a particular report.

The third step is the determination of percentages, corresponding to each tally, with respect to any one of four possible bases for percentage to be used for a particular report.

These bases are the number of interviews in the complete file, the number selected, an arbitrary number or a special count from among all interviews in the survey file of those satisfying the conditions specified for this purpose, the spokesman explained.

A supply of formatted sheets for entering interview data as well as instructions for entering the control parameters are included in the users manual that accompanies the RPG-II source code.

Surv02 requires about 14K bytes of main memory, a multifunction card unit, disk and printer, and it costs $3,750, Centauri said from 7250 S.W. 34th, Portland, Ore. 97219.

Seminars Show Two Levels Of CICS Programming

HAWTHORNE, N.J. — CICS application programming will be the subject of two different five-day seminars offered by On-Line Software International (OSI) in different areas across the country this autumn and winter.

A lecture/lab course provides Cobol or PL/I programmers with the knowledge necessary to code, debug and execute a CICS/VS application using the command level interface available with CICS/VS Release 1.3. The commands and their functions are discussed along with application design considerations, OSI said.

Another course provides the Assembler, Cobol or PL/I programmer with all the tools — familiarity with the available facilities and an understanding of how to apply them — to program a CICS application at the macro level, the firm said.

One presentation of this course is underway now in Chicago; another will be in Boston starting Nov. 7; a third, in the New York area on Jan. 16.

OSI charges $500 per person for attendance at its five-day courses, the spokesman added from Software Plaza, Route 208, Hawthorne, N.J. 07506.

STSC Plans to Serve 13 Nations This Year

BETHESDA, Md. — Scientific Time-Sharing Corp. (STSC) has announced plans to offer its APL-based time-sharing services on an international basis. Local access is already available in seven countries, but this will grow to 13 nations before year end, according to the company.

The extended network will encompass much of Western Europe, Canada, Mexico as well as Hong Kong and the U.S., including Puerto Rico. Access to the STSC Amdahl 470V/6 located here will be by local call from the user's offices, a spokesman added.

The company's international operations are being implemented from its New York City office located at 747 Third Ave., New York, N.Y.

Seminar Set to Cover Accounts Payable

NEW YORK — The average company overpays one out of every 10 bills it receives, according to the brochure advertising the American Management Associations seminar on "Developing Computer Systems for Accounts Payable."

The three-day course will be presented in Atlanta the end of this month, in New York in November and in Los Angeles in December.

The agenda starts with the systems planning phase of a payable conversion, moves into detailed considerations of such things as analyses of vendor invoice terms and matching of invoice/receiver and purchase orders, before closing with a review of management reports.

The registration fee is $460 for Association members and $530 for others, the association said from 135 W. 50th St., New York, N.Y. 10020.

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'Planits' Generate Formats

TULSA, Okla. — Two similar programs, Planit-S and Planit-P, allow the user of an NCR 8200 to enter format parameters through a CRT. These parameters are stored as a source language and may be listed, modified and saved in an Editor-compatible text file, according to the vendor, Sage Computers, Inc.

The user enters statements in an interactive mode and can test print for intermediate results. Planit-S offers a SHOW command which allows the user to display a dummy screen on a CRT, to see exactly how the proposed screen will appear, even before any programming is done.

Planit-P works similarly, except that it generates formats for reports, Sage explained. The user can tell the system to right-justify a field ending in a given column, left-justify a field or center a field.

The advantage continues, the spokesman asserted, during development since programmers "can see very clearly" what is necessary to generate a given screen or report format. That also cuts down on the modifications so typically needed after a system has been installed, he added.

Planit is available for $850. It is also available in combination with the firm's Fastbol and Cobol precompiler and Xref cross-reference generator for $1,200, the company said from 2323 S. Sheridan Road, Tulsa, Okla. 74129.

'Stars' Schedules Resources, Shows On-Line Job Status

CHERRY HILL, N.J. — The Status and Revision System (Stars) software, developed by Value Computing, Inc. (VCI) as a "natural extension" of the company's computer and data center scheduling packages, is already in use in various IBM OS/VS environments.

Both the System III Scheduler and the Data Center Scheduling System were designed to schedule resources to produce the best job mix for a shift or a day in advance, he explained. System III is limited to a single CPU, whereas the data center scheduler works with all the CPUs and all other work locations within the data center.

Until now, neither really had a facility to ease the revision of schedules such as almost any center faces from time to time. But Stars tackles that problem: It provides on-line status information of jobs being procesed as well as a method of revising the original schedule when it has become obsolete.

With Stars operations, management can receive current actual data compared to schedule job statistics.

Stars is said to be synchronized in real time to work actually underway, feeding up-to-the-minute status reports back into the Value scheduling algorithm, which then produces a revised plan. The system can be used in single- or multiple-CPU environments, the spokesman added.

The VCI scheduling packages range from $11,000 to $24,000. The Stars extension costs an additional $6,000 for the first CPU and $2,000 more for each additional system to a maximum of $10,000, the company said from 300 VCI Bldg., W. Marlton Pike, Cherry Hill, N.J. 08002.

Update Handles NOW Acounts

OAK BROOK, Ill. — The Demand Deposit/Credit Reserve System from Weiland Computer Group has been enhanced so that it now does more than combine demand deposit accounting with an integral credit reserve feature, commercial account analysis and descriptive/combined statement features, the vendor said.

The multibank/multibranch system has been updated to include negotiable order of withdrawal (NOW) accounting capabilities and GIRO-type interest calculation on negative balances.

The software runs on IBM 360/370 under DOS, with CICS required for optional on-line operations. The basic package costs $34,000 and the on-line capability adds another $10,000. An account reconciliation module costs an additional $7,500.

Weiland is at Suite 101, 814 Commerce Drive, Oak Brook, Ill. 60521.

Japanese Users Get Call/370

GREENWICH, Conn. — Companies in Japan can now join those in the U.S., Canada and Western Europe as users of Control Data Corp.'s Call/370 Management Time-Sharing Service, a CDC spokesman said recently.

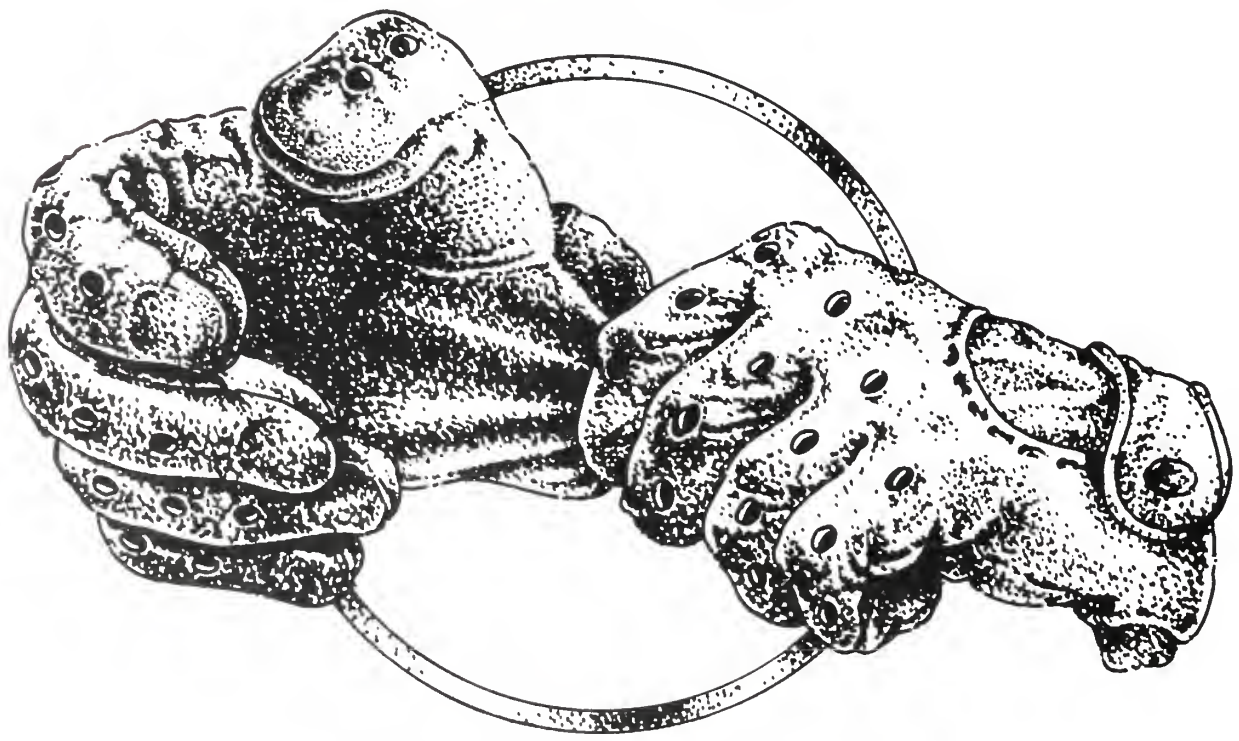
The service allows users to share comon data bases and to share programs for such tasks as monthly financial consolidations, sales comparisons and analyses and management reporting systems.

Data Services Far East, Inc., a CDC subsidiary with marketing and support personnel in Tokyo, is responsible for marketing the service in Japan.

Offered by the Service Bureau Co., another CDC division in this country, Call/370 is known as Call/CDC in Canada and most European countries by other CDC units.

The Service Bureau Co. is at 500 W. Putnam Ave., Greenwich, Conn. 06830.

Data Base/Data Communication



The Perfect Fit from Cincom Systems

Data base and data communication software must go "hand in glove" to realize their maximum contribution to an organization's information system plan."

This statement is heard over and over again from the *successful implementors of complex, on-line systems.* It certainly is logical! Yet . . . we still see the occasional disappointed user who has violated this principle and attempted to get by with the old interface approach.

Cincom's performance-oriented solution to this DB/DC requirement is to "perfectly fit" the strong "hand" of the *TOTAL Data Base Management System* . . . serving nearly 2000 customers worldwide . . . with its fully integrated "glove," *the Environ/1 Data Communication System.* The on-line results of such meticulous tailoring include:

Optimum Performance and Efficiency
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On National Issues

TCA Called 'Unique' for Speaking Out

SAN DIEGO — The Tele-Communications Association (TCA) has become the first multi-industry user association to take a position on a national issue, according to Daniel Grove, newly elected TCA president.

Speaking at a recent conference here, Grove explained that the user group had decided to speak out on national issues because "if we didn't represent the voice of the user, no one would."

Grove was referring to the recent position taken by TCA which supports competition in telecommunications and opposes the concepts of the Consumer Communications Reform Act. "Our ability to effectively manage the telecommunications resource for our respective employers will largely be determined by decisions that may soon be made in Washington," Grove said.

'Unique Among Organizations'

TCA is "unique among user organizations" because of a provision in the bylaws that enables the group to express its views on pertinent issues. Most telecomunications user groups have "shied away from this type of activity," Grove said, adding that "we demonstrated that it is possible to obtain a consensus of opinion from a widely diversified membership base."

As a result of the TCA policy of speaking out, a total of 27 man-days has been spent in Washington. This has shown that Washington policy makers are sincerely interested in hearing from users. And until now, there has been a dearth of user input to the legislators, Grove told attendees.

Among the testimony given by TCA members in Washington has been an explanation of the role that telecommunications plays in business and industry; and discussions of problems associated with the level of home telephone rates, he said. Hopefully, the involvement of TCA in legislative issues will continue, he added.

The participation of the TCA in legislative debates is "just a beginning." Previously, the objective of the user group was to educate the membership on changes taking place within the industry. "Now we are actively seeking to affect the outcome," Grove said.

Ferris Nominated To Succeed Wiley

WASHINGTON, D.C. — Charles D. Ferris, general counsel for House Speaker Thomas P. O'Neill Jr., will succeed Richard E. Wiley as chairman of the FCC, if confirmed by the Senate.

Wiley sent his resignation to the White House early in September, stating his intention to be gone from the commmission by the end of this week. He has remained as a commissioner and as chairman of the FCC on an interim basis since his term expired on June 30. Wiley expects to return to the practice of law, sources said here.

Ferris was an aide to the majority leader of the Senate before serving on O'Neill's staff. He was also a research physicist for Sperry Gyroscope in Great Neck, N.Y.

Sycor Offers Display Systems Compatible With IBM 3270s

ANN ARBOR, Mich. — Sycor, Inc. has announced its 290 Series of on-line display systems which is compatible with the IBM 3270 CRT series.

The Sycor 290 systems can reportedly be leased for up to 25% less than the 3270s or purchased at an even greater savings.

Any host computer which can support a 3270 with a 1,920-char. display screen can support a Sycor 290 — with no reprogramming, a Sycor spokesman said.

Terminal operators accustomed to the 3270 will find that the 290 keyboard arrangement, screen size, screen attributes and the operation of the terminal will be "virtually identical," and retraining is not necessary, he said.

The microprocessor-controlled 290 is available in three versions for either remote or local channel use.

Sycor's 291 and 296 remote configurations can use either Binary Synchronous (BSC) or Synchronous Data Link Control (SDLC) line protocols over leased communications facilities at transmission speeds of from 1,200 to 9,600 bit/sec, the firm said.

The 291 remote cluster control unit will accommodate a combination of up to 16 display stations and printers.

The 296 Control Station is a single display which operates as a mini-cluster controller and supports a combination of up to eight display stations and printers.

Like the 291, the 292 local cluster control unit can support up to 16 devices but attaches directly to an IBM 370 channel.

The display station of the 290 systems has a 15-in. screen with a 1,920-char. capacity. It uses a 7 by 9 dot matrix for upper case and a 7 by 12 dot matrix for lower case characters. Additionally, a protective plastic filter reportedly improves contrast and comfort for operators by significantly reducing glare.

Optional features available with the 290 display station include a light pen for multiple-choice applications; a numeric function pad for fast entry of numeric information; a badge reader for operator identification and security; and key locks to secure each station when not in use.

Also available with the 290 models is Sycor's bidirectional, microprocessor-controlled Sprinter printer with speeds of 60-, 120- and 180-char./sec. Sycor maintains complete control over the design and manufacture of the Sprinter printers and has eliminated many of the mechanical parts to assure greater reliability.

(Continued on Page 36)

Articles Requested For CW 'Special' On Data Networks

Networks are no joke. They are serious business to users, with the cost of facilities rising and terminal equipment becoming more complex. Networks and user problems in selecting, configuring and operating them will be covered in a *Computerworld* special report to appear in the Nov. 30 issue.

Articles relating to networks will be considered for inclusion in the special report if received no later than Oct. 21. Length should be about 4-5 pages typed, double-spaced. Stories should be sent to Ron Frank at CW, 797 Washington St., Newton, Mass. 02160.

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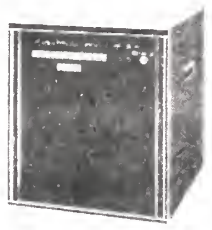
Channels: Maximum of 18 channels
Diagnostics: Remote and local loopback test, busy-out, indicators
Multi-drop: Drop one or more channels at a number of locations
Multiple access: Multi-drop channels have equal opportunity for processor channel
Line: Dial or dedicated
Options: Voice-plus-data, data regeneration

$465 basic unit
$325 channel end

codex

Series 900 time division multiplexer



Data rates: Mixture of synchronous or asynchronous up to the high speed modem aggregate
Channels: Up to 64 channels
Diagnostics: Remote and local loopback, busy-out
Line conditioning: C2 conditioning recommended
Options: Auto speed detection, multi-drop

$1283 basic unit
$152 [illegible] channel end

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Grove Chosen To Head TCA

SAN DIEGO — Daniel Grove of Motorola, Inc. was elected president of the Tele-Communications Association at the user group's annual conference here recently.

Harvey Campbell of the University of California at San Diego was elected first vice-president, while Pete Osborne of Rockwell International was made second vice-president of the organization. Tom Buckle of the California state Automobile Association became third vice-president, while Robert Swanson of Credco of Arizona, Inc. was elected secretary and George Lombardo of Transamerica Corp. became treasurer.

TCA directors for the coming year include Bob Barnwell of Fibreboard Corp., Martin Hill of Boeing Co., Keith Sowell of the Arizona Department of Public Safety, Joe Ballestracci of the Los Angeles Board of Education and Mark Mills of Kaiser Permanente.

More than 90 exibitors displayed products and services at the conference and more than 500 members and guests attended the meeting, according to Barnwell, outgoing president.

The 1978 TCA conference will be held Sept. 26-28 in San Diego, it was announced. Information about TCA is available from the TeleCommunications Association, 424 S. Pima Ave., West Covina, Calif. 91790.

SNA Here to Stay: Doll

Special to Computerworld

CHICAGO — IBM's Systems Network Architecture (SNA) is here to stay and might even make an appearance in IBM's distributed processing future, according to Dr. Dixon Doll, President of the DMW Group, Ann Arbor, Mich.

"There is nothing intrinsic to SNA that would prevent the implementation of a lean, mean and hungry version using Series/1 minis, even though such a capability has yet to be announced by IBM," Doll told the 8th Annual Professional Training Conference, sponsored by Advanced Systems, Inc. here recently.

"I don't think SNA is going to die. It's got problems, but they will be worked out, even though it will take a long time. There will be no vacillation by IBM on SNA," he said.

In his overview of trends in data communications and distributed processing, Doll said future network structures will have to assume shapes similar to the structures of user organizations, both hierarchical and linear. That requires functions which will allow organizations to plug into three types of networks, because they are likely to need all three.

He listed intelligent public networks such as the Bell Data Network (BDN) and Telenet, intelligent provided networks such as SNA and Decnet, and what he called "pseudo-public" networks which share users within an industry such as the users of Electronic Funds Transfer Systems by banking.

As for the expected competition for the communications dollar between IBM and AT&T, Doll predicted the telephone company would increase prices in local and metropolitan areas to take advantage of the assumed inability of IBM to address most locations with its proposed satellite telecommunications system.

Unit Monitors Full Duplex Data Streams

ALTAMONTE SPRINGS, Fla. — Availability of a data communications line monitor known as Epiview has been announced by Epicom, Inc. The device accepts full-duplex data in either synchronous or asynchronous modes at communications speeds up to 100,000 bit/sec. Data is displayed in Ascii, Ebcdic or hexadecimal codes on the Epiview built-in CRT. Other line disciplines are optionally available.

In its standard configuration, Epiview displays data on its integral 5-in. CRT, with selected segments accentuated by character blinking and/or reverse imaging. The instrument will also drive a 9-in. or 12-in. auxiliary CRT, which is optionally available.

Epiview can be used to view data stream in real time, or it can be teamed with the Epitape recorder.

Epiview is available in a portable version, and an optional modification kit permits rack-mounting. Single-unit price is $3,300, from Epicom, Inc., 592 N. Douglas Ave., Altamonte Springs, Fla. 32701.

Sycor Systems 3270-Compatible

(Continued from Page 35)

Diagnostic routines are supplied with the 290 systems. They are designed to be used by both nontechnical user personnel and by Sycor service representatives.

The purchase price of a typical 290 configuration including six display stations and a Sprinter printer is $34,980.

Comparable monthly lease rates for one-, two- and three-and-one-half-year contracts are $799, $731 and $639 respectively, including maintenance.

Delivery of 290 systems will begin in the fourth quarter of this year from Sycor, Inc., 100 Phoenix Drive, Ann Arbor, Mich. 48104.

Computer Optics announces a new 3270 feature.

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Believe. And $5,950 is for a quantity of one. Now you can afford a genuine Datapoint for those applications where computer power was needed but couldn't be cost-justified.

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The 1500 will communicate in IBM 3780 discipline, or DATAPOLL® for Datapoint-to-Datapoint communications. Auto-answer is standard. You needn't halt an ongoing data entry operation to communicate — with the 1500 you can communicate while an operator continues to enter or process data. Or, you can elect to do concurrent printing on an optional Freedom Printer™.

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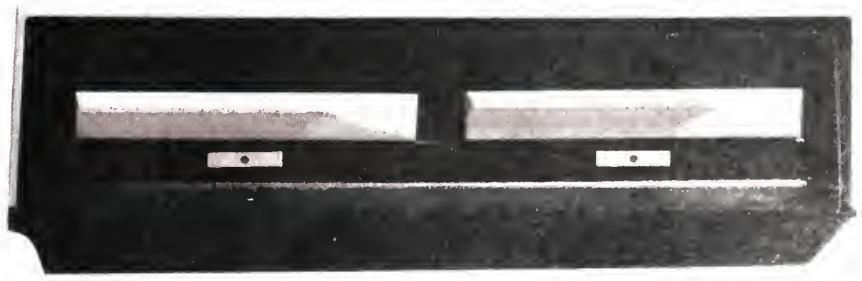

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Olivetti Terminal Bows

NEW YORK — Olivetti Corp. of America introduced the TC808 terminal system oriented to applications requiring interactive or batch communications with optional hard-copy output.

The terminal is reportedly suited to on-line communications users and remote data entry users who require limited terminal intelligence, limited peripheral connections and printed response.

Standard equipment on the TC808 terminal includes a central control unit, a synchronous or asynchronous line control unit which handles a range of communications protocols, and a work station with keyboard and printer.

Protocols supported by the TC808 include Binary Synchronous Communications, the IBM 2980, 2780, 3270 and 2848 terminals, Burroughs TC-500 and TC-700, NCR 270, Univac and Honeywell, a spokesman said. Cassette storage is provided for application programs.

The basic configuration of the TC808 includes 16K of storage, asynchronous or synchronous line control, keyboard and integrated printer for $7,500, he said. Maintenance is $47/mo and options include the 260-char. CRT for $700.

A minimum order is five terminals, the company said. First deliveries are scheduled for the beginning of 1978 from Olivetti Corp. of America, 500 Park Ave., New York, N.Y. 10022.

Dual-Intensity CRT

HIS Expands VIP Family

WALTHAM, Mass. — Honeywell Information Systems has added another model to its Visual Information Projection (VIP) family of display terminals — the VIP 7200.

The asynchronous VIP 7200 features a 1,920-char., dual-intensity display capability. The terminal is designed as a conversational teleprinter-compatible workstation for use with Honeywell's Level 6 minis and other Series 60 systems for such applications as time-sharing with large Level 66 computers. In addition, it can communicate with Series 2000 and 6000 systems.

Typical uses include problem-solving in engineering and scientific environments, program development and low-volume data-entry transaction applications.

The dual-intensity screen provides a lower-intensity projection of information from the computer and a brighter intensity of data being entered by the operator. This is reportedly helpful in fill-in-the-blanks types of applications, such as order entry or inventory control, Honeywell said, since it enables operators to focus on and edit data just entered.

Terminal Transactions

Cursor Movement

Full cursor movement across 24 lines of display is provided. The cursor is both readable and addressable for program-control purposes. The keyboard includes 86 keys arranged in alphanumeric and numeric groups and can generate 128 Ascii codes.

In addition to the alphanumeric, special-character and numeric key pads, seven special-function keys are included on the keyboard as a standard feature.

A scroll capability is provided for single-character transmission in conversational-mode applications such as program development or problem-solving. Buffered transmission for a line or a page (a full screen of 1,920 characters) also is standard, enabling operators to edit data before completing transactions.

Variable Rates

Transmission rates vary at standard increments between 75 and 9,600 bit/-sec. The terminal includes both 20-milliamp current-loop and RS-232C interfaces.

A single VIP 7200 may be purchased for $1,980 or may be leased on a five-year contract for $70/mo, including maintenance.

Omnitec Offers Phone Coupler

PHOENIX — The Omnitec Data Model 702B telephone coupler allows companies to use remote conversational terminals for both computer time-sharing and message communications.

Because most remote computer terminals are used primarily to initiate calls to a computer, they are equipped with originate/only modems. To allow terminal-to-terminal as well as terminal-to-computer communications, the $436 unit can be used as either an originate or answer coupler, the company said.

Simultaneous Outputs

Outputs from both interfaces are available simultaneously, so one 702B coupler can be used to drive a CRT.

Switch selection of full-duplex communication also lets users simultaneously transmit and receive information with one telephone connection, according to Omnitec Data at 2405 S. 20th St., Phoenix, Ariz. 85034.

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Micom Adds Multiplexer, Teletype Error Controller

CHATSWORTH, Calif. — Micom Systems, Inc. has introduced the Model 520 error controller for Teletype Corp.-compatible terminals operating on dial-up lines and a wideband digital multiplexer for applications running at 230.4 Kbit/sec.

The Micom 520 error controller is a "black box" implemented with MOS/-LSI devices that provides automatic retransmission-on-error according to the firm.

A Model 520 is installed at each end of the data link between the teletypewriter or CRT terminal and modem at one end and between the computer port and the modem at the other end, a spokesman explained.

No changes to existing hardware or software are required; data compression is performed to avoid the need for additional overhead on the data link, Micom claimed.

The device can be used with terminals operating asynchronously at speeds to 2,400 bit/sec. It transmits all data in a block format with a cyclic redundancy character check character to detect block errors.

Any block error detected causes automatic retransmission, the spokesman noted.

Typical applications for the error controller include time-sharing services used with programs requiring minimum error rates such as numerical control, statistical analysis, text editing and financial reports; and remote connection of terminals to small business systems with unsophisticated communications capability, according to the firm.

Wideband Multiplexer

Micom's Model 720 digital data multiplexer was designed for channelizing Bell Digital Dataphone Service (DDS) links, but is now being offered for use in wideband multiplexing applications.

The 720 is said to be the only time-division multiplexer available to multiplex synchronous and asynchronous channels, dial-up or dedicated, on both DDS circuits at 56 kbit/sec and wideband analog circuits at 50- or 230.4 kbit/sec.

Systems uptime is maximized with redundant common logic and power supplies; monitoring and fault isolation on the composite high-speed data link are available from either end, according to Micom.

Prices for the multiplexer start at less than $2,000 per terminus. Micom's 520 error controller costs $795, it stated from 9551 Irondale Ave., Chatsworth, Calif. 91311.

Breakout Panel Tests V.35 Link

PROVIDENCE, R.I. — International Data Sciences, Inc. (IDS) has added the Model 80 CCITT V.35 interface/-breakout panel to its Minitest line of diagnostic products.

The Model 80 is a battery-powered, hand-held instrument designed to monitor and break out a standard CCITT V.35 interface between a modem and a terminal, IDS explained.

In use, the V.35 interface cable between the modem and the terminal is plugged into the Model 80. This allows access to all 17 signal conductors specified by CCITT V.35 or Bell 306 interface specifications, IDS said.

The balanced data and clock signals are monitored by a balanced receiver with an LED indicator. Thirteen switches allow all interface signals to be interrupted for testing and monitoring, the company said.

Pins next to each switch allow miniature jumper cables to be used for cross-patching of signals, a spokesman added.

The Model 80 is priced at $990 from IDS at 100 Nashua St., Providence, R.I. 02904.

Infotester Analyzes Modems

PENNSAUKEN, N.J. — The Infotester, a portable test set from Infotron Systems Corp., can analyze the performance of synchronous and asynchronous modems and frequency and time-division multiplexers.

Functions include detection and display of bit and block error rates, determination of request-to-send and clear-to-send turnaround times and measurement of distortions and overspeed variations, according to Infotron.

Panel Control

All front panel controls are arranged for step-by-step operation with nonabbreviated legends. Each knob and switch has only one function, eliminating the confusion caused by a switch having different functions in different modes, the company claimed.

Indicator lights and an LED display are used to display status and test results, it added.

RS-232

The Infotester is RS-232-compatible and operates at all common data rates from 50- to 9,600 bit/sec, or 19.2 kbit/sec with an external clock, according to the firm.

Infotester weighs 24 lbs, is available with an attache case or in a rack-mount version and costs $1,995 from Infotron at 7300 N. Crescent Blvd., Pennsauken, N.J. 08110.

Fabri-Tek has an ace in the hole for PDP 11/70 users.

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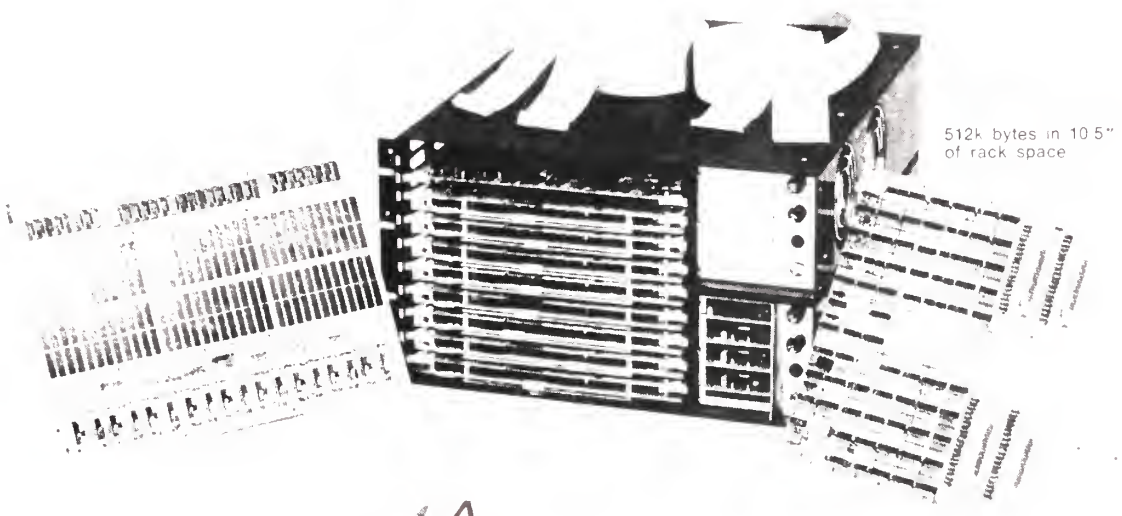

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Programmable Units Assist Toyota Dealers

HOUSTON – Toyota is using Texas Instruments, Inc. Model 742 programmable data terminals in an information system that assists dealers in maintaining automotive parts inventory at an optimum level, records vehicle sales and accomplishes dealership accounting.

The dealership program, called "Toyota Automated Controls" (TAC), ensures accuracy of information by prompting specific entries and editing critical item entries such as part numbers, TI said.

The vehicle sales records and dealership accounting module could not have been added to the system without the intelligent terminals, Toyota said. The programmability of the Model 742 terminal has simplified the input of complex and lengthy transactions. Additional applications to assist dealers are being explored by Toyota.

A Toyota dealer enters vehicle sales, parts sales, adjustments and other parts department information on a daily basis. At night, each terminal is polled and the information is entered into the host computer system for processing.

The system provides the dealership with a parts sales record while maintaining a current on-hand amount, on-order quantity, and pricing on each part number.

According to Toyota, the 742 terminal has decreased input time and error rates by about 50%. In addition, the programmability of the Model 742 terminal has reportedly allowed expansion to more complex operations.

Removing the rose-colored glasses.

A realistic look at *Data Base Management Systems* in the October 31st *Computerworld*.

In the ten years since Data Base Management Systems were introduced they've grown to a multimillion dollar subindustry in their own right. As late as 1973, less than 1,000 DBMS were installed; but International Data Corp. estimates that over 5,000 are in use today, and this number will increase to 8,200 in the next two years. This phenomenal growth has been fueled by the hoped-for benefits of DBMS, which include increased programmer efficiency, the elimination of redundant information in the data file, and greater ease in coping with system upgrades and reprogramming.

But a data base management system should be evaluated carefully before you commit to purchase. They have developed such a reputation as problem solvers that people tend to expect more from them than they can achieve, while overlooking or minimizing the effort required.

We'll have several experts on hand to help you arrive at a realistic understanding of DBMS in our October 31st special report edited by Don Leavitt. Here is a sampling of the kinds of articles you'll see:

- Combatting the "Holy Grail" syndrome — Being realistic about the benefits that are possible in relation to the effort required; how to assess whether DBMS will enable you to reach your goals.
- How well are installed systems living up to expectations? A review of typical problems that need to be overcome.
- The role of the Data Base Administrator in DBMS — including considerations like the physical arrangement of the data base.
- How dictionary packages, report writers, etc. interface with DBMS software.
- A review of selection criteria and the implementation process.
- How DBMS ties in with distributed data processing — matching intelligent front ends with intelligent back ends, for example.

As this short preview shows, our special report on Data Base Management Systems in the October 31st issue will interest people who are considering DBMS, as well as people who already have one installed. And if you market Data Base Management software, remember that your ad will reach more of your primary audience here. Ad closing date is October 14. Your *Computerworld* salesman has all the details. Or call Terry Williams at (617) 965-5800 to reserve space for your ad.

COMPUTERWORLD
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CRT Widens Characters

ANN ARBOR, Mich. – The Model 400D CRT from Ann Arbor Terminals, Inc., is now available with a 40-char. line option, which provides double-wide characters.

The terminal's memory stores 2,000 characters in a 50-line by 40-char. format. Twenty-four lines of data are displayed on the monitor at one time: the remaining 26 lines are hidden and can be accessed in either roll or scroll modes, the firm said.

Three character accents — blink, dim and reverse-video — are standard. The cursor is displayed as a blinking field.

Terminal Transactions

RS-232 data interface is standard, with 20mA current-loop optional. A 15-in nonglare screen is integral to the desktop version, as well as RS-170 video output for driving auxiliary monitors. The KSR version features a detachable 72-key keyboard which includes cursor control keys, a separate numeric pad and TTY lock.

Command functions can be executed from either the keyboard or the computer. Commands include erase memory; cursor home, return, up, down, right and left; set cursor X-position; set cursor Y-position; set screen position; and start blink, dim, reverse-video and normal characters, the company said.

In addition, operation controls can be executed from the keyboard. Typing control 0 puts the Model 400D into setup mode, which allows changing of the baud rate (110-9,600), keyboard mode (TTY or full-Ascii), I/O mode (local, full or half-duplex) and display mode (page, roll or scroll).

Price is $845 for the controller only and $1,495 for the complete terminal. Delivery is eight weeks from Ann Arbor Terminals, Inc. 6107 Jackson Road, Ann Arbor, Mich. 48103.

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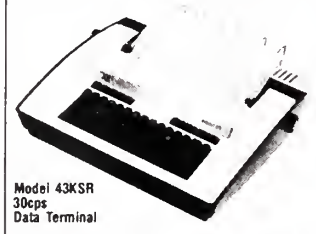

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For Overall Satisfaction

Users Rate MSI, Data Pathing Units Tops

Equipment	Number of Instal-lations	Number of Controllers	Number of Input Stations	Weighted Averages and Response Counts*																													
				Overall Satisfaction					Ease of Installation					Ease of Input					Ease of Training					Hardware Reliability					Maintenance				
				WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P
Portable or Stand-Alone Units																																	
Digitronics Portaverter	3	9	513	3.0	1	1	1	0	3.8	2	1	0	0	3.6	2	1	0	0	3.6	2	1	0	0	2.3	0	2	0	1	1.7	0	0	2	1
MSI 2000, 2100, 2200	6	11	527	3.5	3	3	0	0	3.2	2	3	1	0	3.6	2	4	0	0	3.2	1	4	0	0	3.0	0	6	0	0	3.0	1	3	1	0
Standerd Register Source Record Punch	3	—	17	3.3	1	2	0	0	3.3	1	2	0	0	3.0	1	1	1	0	3.0	1	1	1	0	3.0	1	1	1	0	3.0	1	1	1	0
Telxon 918, 919	5	9	182	3.0	1	3	1	0	3.2	2	2	1	0	3.6	2	3	0	0	2.8	1	2	2	0	2.8	1	3	0	1	2.4	1	1	3	0
All others	2	1	16	3.0	0	2	0	0	3.0	0	2	0	0	3.0	0	2	0	0	2.5	0	1	1	0	2.5	0	1	1	0	2.5	0	1	1	0
Total Porteble or Stand-Alone Units	19	30	1255	3.2	8	11	2	0	3.3	7	10	2	0	3.3	7	11	1	0	3.1	5	9	4	0	2.6	2	12	2	2	2.6	3	6	8	1
Integrated Systems																																	
Deta Pething Inc..																																	
150-160 Series	3	4	108	4.0	2	0	0	0	4.0	2	0	0	0	4.0	2	0	0	0	4.0	2	0	0	0	4.0	2	0	0	0	3.5	1	1	0	0
2100 Series	5	6	127	3.8	4	1	0	0	3.0	1	3	1	0	3.4	3	2	0	0	3.8	4	1	0	0	3.4	4	0	1	0	3.4	2	3	0	0
Total Deta Pathing	8	10	235	3.9	6	1	0	0	3.3	3	3	1	0	3.7	5	2	0	0	3.9	6	1	0	0	3.7	6	0	1	0	3.4	3	4	0	0
IBM Corp.:																																	
Model 357	6	12	52	2.5	0	3	3	0	2.0	0	1	3	1	2.6	0	4	2	0	2.8	1	3	2	0	2.2	0	2	3	1	2.2	1	1	2	2
1030 Series	10	11	93	2.9	1	7	2	0	2.7	2	3	5	0	3.0	3	4	3	0	3.0	3	4	3	0	2.8	2	4	4	0	3.1	4	3	3	0
2790—S/7	3	7	42	3.0	1	1	1	0	2.0	0	1	1	1	3.3	1	2	0	0	3.0	0	3	0	0	2.3	0	2	1	0	2.3	0	2	1	0
Model 5230	7	7	64	3.0	1	5	1	0	3.0	2	3	2	0	3.7	0	5	2	0	2.8	0	6	1	0	3.2	2	3	1	0	2.6	1	3	1	1
IBM other	3	3	46	3.3	1	2	0	0	3.6	2	1	0	0	3.3	2	0	1	0	3.6	2	1	0	0	3.3	1	2	0	0	3.6	2	1	0	0
Totel IBM	29	40	297	2.9	4	18	7	0	2.7	6	9	11	2	2.9	6	15	8	0	3.0	6	17	6	0	2.8	5	13	9	1	2.8	8	10	7	3
Singer, ell models	4	14	825	3.3	1	2	0	0	3.0	0	3	0	0	3.5	2	2	0	0	3.3	1	3	0	0	2.5	0	2	2	0	2.5	1	0	3	0
All others	5	7	105	2.6	0	4	2	0	2.3	0	4	0	2	2.5	0	4	1	1	3.2	2	3	1	0	3.2	2	4	0	0	2.8	0	5	1	0
Total Integrated Systems	46	71	1462	3.0	11	25	9	0	2.6	9	19	12	4	3.0	11	23	9	1	3.2	15	24	7	0	3.0	13	19	12	1	2.9	12	19	11	3

*Weighted Avereges (WA) are calculeted on e scale of 4 points for eech user response of Excellent (E), 3 for Good (G), 2 for Fair (F), and 1 for Poor (P)

By Frank Vaughan
CW Staff

DELRAN, N.J. — Data collection equipment from MSI Data Corp. and Data Pathing, Inc. received the highest user ratings for overall satisfaction in a recent survey conducted by Datapro Research Corp.

Datapro's report on the results of that survey, "All About Data Collection Equipment," includes ratings from users at 65 installations with installed portable/stand-alone units and integrated systems made up of 101 controllers and 2,717 input stations.

Users were asked to rate their equipment on a scale of 1 to 4 — with 4 representing "excellent" — in the areas of overall satisfaction, ease of installation, ease of input, ease of training, hardware reliability and maintenance. The weighted results are shown in the chart above.

Nineteen installations using portable and stand-alone units responded to the survey. These 19 installations have 30 controllers and 1,255 input stations.

The users rated the MSI Data Corp. models 2000, 2100 and 2200 highest in the area of overall satisfaction. The Digitronics Portaverter, which had the highest ratings in the areas of ease of installation, ease of input and ease of training, received the poorest rating of all equipment evaluated in the area of maintenance.

Forty-six users with integrated systems accounted for 71 controllers and 1,462 input stations. The Data Pathing 150 and 160 series received the highest rating in overall satisfaction as well as in four other areas — ease of installation, input and training and in hardware reliability.

(Continued on Page 42)

College Averts Paper Disaster By Converting Records to COM

LONG BEACH, Calif. — When Long Beach City College (LBCC) here went ahead with its decision to institute a computer output microfilm (COM) system for its student records, it gained an advantage that was hardly expected. It beat a flood.

The college, operating on two main and five extension campuses in addition to 69 satellite centers, had been plagued with the recurring problem of having to search out records dating back as far as 20 years because many adult time-part students take courses at intermittent intervals.

As a result of the need to call up old records, LBCC began generating all new student records on a Sperry Univac 9600 DP system. This took care of current records, but did nothing to alleviate the problem of accessing older ones.

The tasks of converting a huge boiler room full of priceless records into a manageable retrieval system would have been impossible without the use of DP, according to Michael Maas, dean of admissions and records.

The solution was to input the older documents into the 9600 via CRTs and maintain them in memory for six semesters. At the end of that time, a COM service bureau converts the oldest records to 16mm microfilm;

(Continued on Page 48)

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SALES AND MAINTENANCE OFFICES THROUGHOUT THE US AND CANADA

AMA Slates 'DP Crisis' Seminar

NEW YORK — The American Management Associations (AMA) will hold a three-day seminar on "The Crisis in DP Organization: The Impact of Minis, Data Bases and Distributed Systems" here Nov. 7-9.

The seminar will cover the stages of DP growth in a historical perspective; the alternatives for the use of minicomputers; hardware and software differences between large-scale systems and minicomputers; centralized vs. distributed systems; and the impact of data base management systems.

The seminar, which will be held in the Americana Hotel, will be chaired by Jon S. Gould, vice-president and director of applied technology for Citibank here.

Guest speakers will incude Capt. Grace M. Hopper, U.S. Navy; Gary Audin, vice-president of Logica, Inc. here; and Ralph G. Berglund, data communications consultant, Cherry Hill, N.J.

The cost of the seminar is $375 for association members and $430 for nonmembers.

Additional information on the course, catalogued Priority No. 6333-07LC, can be obtained from Karen Johnson, AMA, 135 W. 50th St., New York, N.Y. 10020.

MSI, Data Pathing Units Get Top Honor From Users

(Continued from Page 41)

The data collection equipment most commonly discussed in the report can be termed key entry, source data automation and factory data collection, the report explained.

Key entry was defined in the report as that which is done in batch mode on keypunch equipment. Many users of this method said they desire alternatives, Datapro reported.

Source data automation was described as the capture of data as the byproduct of a conventional business transaction. Optical character readers and/or recording typewriters were seen by users to be the answer for eliminating the need for double keying of business information. This equipment was thought of in terms of a "clean" office or store environment.

Factory data collection is recording data on the shop floor. This is the "dirty" or industrial environment equivalent to source data automation, the report said.

Any organzation that is now operating a factory, warehouse, hotel, truck fleet, school or some other type of business, nonprofit organization or government agency is a potential user of data collection equipment.

This existing organization is now collecting data about its operations in someway, the report noted, so the question is whether data collection equipment can provide a less costly or more efficient method of collecting.

The organization must also ask whether it can provide the means for collecting more data or more relevant data than the current system.

In the report, equipment listings for portable/stand-alone units contain information on the type of unit, output media, environmental orientation, data input specifications, physical properties, recording devices, prices and availability.

The systems are listed by arrangement, environmental orientation, input station specifications, central controller specifications, pricing and availability.

"All About Data Collection Equipment" is available for $12 from Datapro Research Corp. at 1805 Underwood Blvd., Delran, N.J. 08075.

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When you need advanced software for manufacturing application systems, our new MAS-80 family can cover you through the 1980's.

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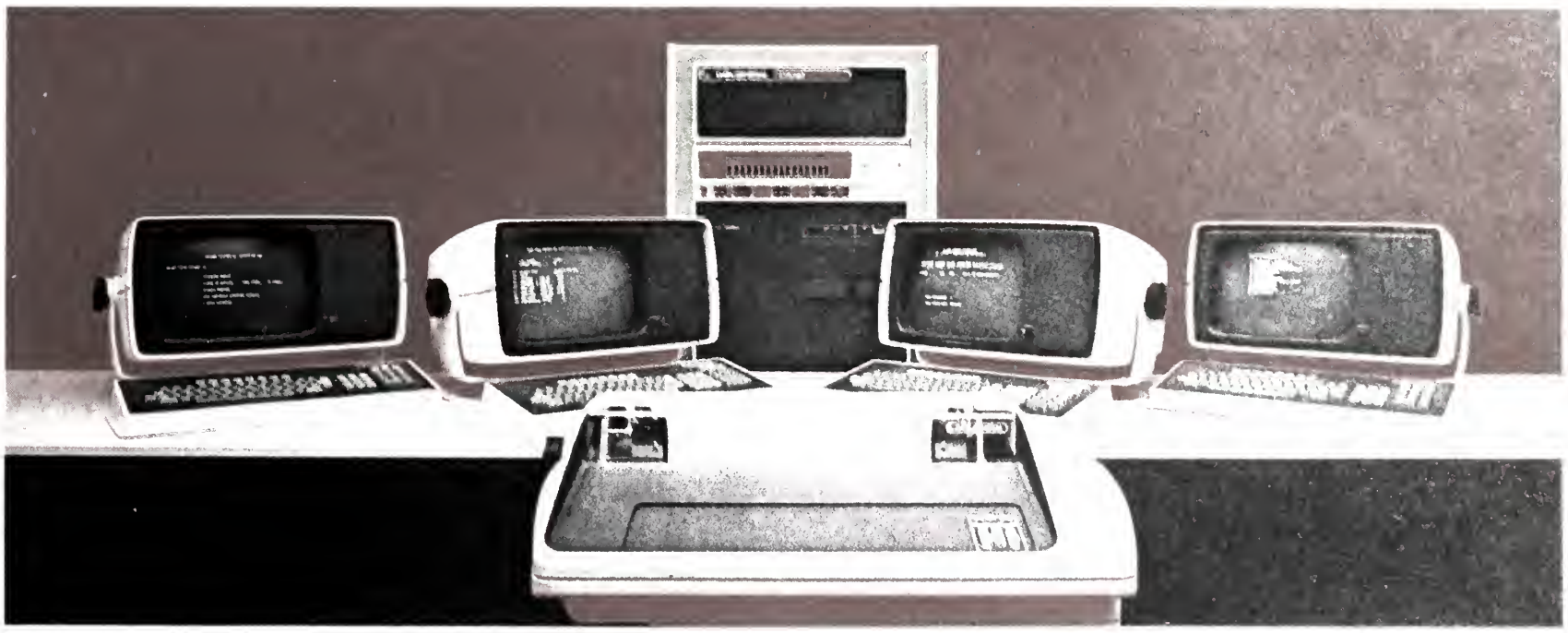

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On-Line Entry Speeds Chemical Firm's Orders

CINCINNATI, Ohio — Improved customer service, faster and more efficient operations, greater accuracy and better control are the major benefits claimed by Emery Industries Inc. for its on-line order entry and billing system.

Emery Industries manufactures a variety of specialty chemicals that are used in different consumer and industrial products. Until recently, the firm operated an order entry system using 80-column edge punched cards and punch tape equipment.

To improve operations the company converted in June 1976 to an automated on-line order entry and billing system called Computer Order Processing at Emery (Cope). An IBM 3,0/10 system with 192K bytes of main memory with 3270 CRTs and both 3781 and 3780 printers is the heart of the system which was developed jointly by the DP department and the chemical sales office under the direction of the corporate controller.

Conversion to the system included implementation of a data base/data communications system using an entry level version of Data Language/I and the Customer Information Control System (Cics). Conversions were made from DOS to DOS/VS, from 2319 disk drives to 3330 disk drives and from Cobol D to Ansi Cobol for slightly less than 1,000 programs.

All of this was accomplished along with major revisions to other systems and programs between February 1975 and June 1976. The DP and systems staff at Emery consists of 18 people, divided equally between operations and systems and programming, a spokesman explained.

Three Main Files

The order entry and billing system operates five days a week, using three main files. One is a customer master data base file with name, address, sales, territory and credit data. The master file also contains special instructions relating to product labels, modes of shipment, traffic and standard routings.

Another main file is an open order shipment file containing the status of all open orders and several months of shipped orders. This file is tied by invoice number to customer data and by product number to the third major file which contains product numbers, descriptions and codes for special grades or special packaging. All data entered in these files through CRTs is edited for accuracy and completeness by the system.

Orders come to the order entry department where three CRTs and two printers operate. Another CRT and two printers are operated at the Emery manufacturing plant in Cincinnati while a fifth CRT is used in the company's DP department, the spokesman explained.

Received by phone, mail or teletypewriter, order data is entered on a worksheet. Customer and sales territory numbers are determined from microfiche records. An order entry is called up on a CRT, the customer and sales territory numbers are entered and the customer information is displayed on the screen of the terminal.

While all constant customer information is displayed, the keyboard is then used to enter variable data such as any address change, sales code, order date, customer purchase order number, any changes in credit terms, requested shipping date, routing and freight terms.

Next, a product information screen is displayed which shows data for all products regularly ordered by the customer. Quantities and container codes for each product are entered in the terminal. Item prices are entered on a price screen and special instructions such as marking, labeling and notice of shipment requirements are selected from a customer instruction review screen. This completes the order entry process.

The bill of lading and all the shipping papers for the order are printed out at Emery's Cincinnati plant. A customer acknowledgement copy is simultaneously printed in the sales department and the order is also stored in the computer system.

When an order is shipped, the Cincinnati plant uses an order shipping screen on the CRT to enter the shipping date, any routing changes and actual quantity shipped. Other information includes vehicle number on a tank car, gross, tare and net shipping weights and an analysis or lot number for each product.

The open order/shipment file is instantly updated and invoices are automatically printed the following day, the spokesman said. Shipping data for three months as well as data on all open orders is then available for inquiry simply by calling it up at a CRT.

Each evening, order status reports are produced for each of the sales territories. All orders received, shipped and billed are listed, denoting any changes from previous reports and listing dates and actual weights of shipments. These reports are mailed to salesmen in each of the territories. An expediting report, showing orders by requested shipping date is also produced daily, in addition to an exception report listing items shipped but not billed and the reason.

Each week, an open-orders-by-product report is generated for use in current production scheduling. Once a month, planned production is entered in the system and compared with

(Continued on Page 48)

Sycor announces an on-line system that's shamelessly "me, too."

(Except for the price.)

We're proud to introduce an on-line system that offers as much as the big guy's system. For a lot less.

It's the new Sycor 290—a 3270-compatible display system that can save you up to 25% over a three-and-a-half-year lease. And even more when you purchase.

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Involves Nationwide Net

Shared Processing Brings Significant Savings

By Jerry Tieszen
Special to CW

ORLANDO, Fla. — Martin Marietta Data Systems (MMDS) has saved more then $1 million by consolidating its data processing here on dual IBM 370/168s utilizing the MVS operating system, associated peripheral equipment and a nationwide telecommunications network.

The host center, which began operations here in early 1977, was the culmination of several large interrelated projects, and the resulting savings are being realized by both MMDS's DP customers and by the corporation's dispersed divisions.

In mid-1974, the Orlando data center was providing batch processing (over the counter and remote job entry), interative Time Shared Option (TSO) for support of engineering and programming users, and on-line/batch IMS data base inquiry/update capabilities to the Orlando users on a 370/168 operating under MVT/Hasp. The Denver data center was offering the equivalent functions to the Denver area customers on a 370/158-370/145 configuration.

Denver Center Weakened

The first phase of this Shared Resources Processing (SRP) project was successfully implemented in April 1975. All non-IMS related batch Denver business scheduled and checkout batch work and TSO had been moved to processing in Orlando. The configuration in Denver had been reduced to a 370/155 with a minimum peripheral configuration to support on-line IMS/associated IMS related batch and some engineering users.

The net annual cost savings to the company and hence, customers, was approximately $500,000. This was largely due to the use of the proper telecommunications circuit configuration, the higher internal speed of the 370/168 and an appropriate work initiation scheme. The schedules for processing of the Denver business load (including financial, manufacturing, engineering operations, etc.) received little or no adjustment compared with the previous Denver processing schedules.

The second phase of the SRP project was successfully accomplished in October 1975 and resulted in all batch/TSO/IMS functions for both Denver and Orlando customers being processed in the Orlando 168 host center. This added an additional cost savings of $500,000.

Difficulties Experienced

On occasion, difficulties were experienced with the communications circuits due to random error conditions utilized for IMS and TSO between Denver and Orlando. These line difficulties were brought under control by implementing the Denver to Orlando portion of the current MMDS communications network utilizing Comten 3670/3650 communications processors.

At the time of initial implementation of Phase II of the SRP project, it was necessary to provide 11 9,600 bit/sec dedicated circuits between Denver and Orlando to service the Denver area batch/IMS/TSO users. Many 4,800 bit/sec channels were multiplexed over these circuits to provide IMS/TSO users with the same line speed configuration as existed before the consolidation.

A 50k bit/sec circuit between Orlando and Denver was also utilized at night for batch traffic between Orlando and Denver. When the Denver to Orlando communication network became operational, the number of 9,600 bit/sec circuits were reduced from 11 to five, and the subsequent use of the 50 bit/sec circuit was eliminated.

Consolidation Projects

Subsequent consolidation projects involving merging of customer workloads into fewer but larger host centers to accomplish additional cost savings have involved the placement of Comten remote communications processors in the appropriate geographical region. This allows interfacing with customer terminals in the area where host processing previously was accomplished.

The ease of interfacing customer terminals to one of the existing Comten nodes allows rapid implementation of a customer's terminal into the MMDS network with appropriate access to the host processing center. The structure of the Comten network allows the multiplexing of traffic from several customer's terminals between the Comten remote concentrator and host center, thereby providing significant economies in circuit costs.

For example, it is possible to interface a dozen terminals with a Comten in the Baltimore area and only utilize five 9,600 bit/sec circuits between Baltimore and Orlando. This presents significant savings in line/modem costs.

The cost savings benefits of consolidated processing are expected to be enhanced and further extended with the advent of the 3033 size of processors in a combined host center. With the near doubling of CPU capacity, for

(Continued on Page 48)

BASF invented magnetic tape back when 3M meant great giftwrap tape.

Back in 1932, when a phone call cost a nickel and Prohibition was still the Noble Experiment, BASF invented magnetic tape . . . the forerunner of all of today's high-density data processing media. The state of the art has advanced considerably since then, and of course we have some fairly impressive competition. That's why, here at BASF, we've never been content being first. We can only settle for being best. And we've had more time to get that way than anyone else in the business.

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BASF The Original.

Computer Tapes Disk Packs Flexydisks Word Processing Supplies

College Gains Unexpected Bonus With COM

(Continued from Page 41)

appropriate indexing information is stored on microfiche.

While documents representing years of records had been filmed in "file drawer" sequence on 16mm cartridges in the past, that did not mean all documents pertaining to a specific student were in one place. The key role the 9600 CPU plays is the indexing of the hundreds of microfilm cartridges to assemble all relevant references to each student. The student index is arranged alphabetically on nearly 100 sheets of 105mm microfiche.

Now, when an administrator needs documents for a particular student, the operator reads the microfiche to find the numbers of cartridges and frames that contain the documents. LBCC uses 3M Co. Page Search microfilm reader/printers to call up the frames. If copies are needed, the reader/printer produces them on dry-silver paper.

The clerical time saved in the file searches alone would underwrite the entire cost of file conversion and microfilm within two or three years, according to Maas. He anticipates freeing two people, who have been handling transcript and other file searches, for other necessary work in general education classification.

It would cost more than $20,000 a year to hire and train new people for this work, he said.

The hidden benefit of the conversion came the day after the last records were removed from the boiler room. A pipe burst and flooded the area. The dousing would have caused untold damage to the records if they had still been stored there.

A price tag couldn't be put on the records that would have been lost, Maas said. The same standard applies to the improvement in service the school is able to give to the public, he added.

System Expedites Orders

(Continued from Page 44)

products on order and shipped to adjust production to meet market demand for the following month, the spokesman said.

Emery's order entry and billing system is now being operated only in conjunction with the company's Cincinnati plant, he noted. The second phase of the system calls for providing centralized order processing and billing. This will affect about half a dozen sales offices and public warehouses throughout the country. A planned third phase will see expansion of the centralized system to include other manufacturing locations, he said.

The system also has the capability to eventually be used for sales forecasting, production scheduling, inventory control, raw material purchasing and, ultimately, profit optimization through calculation of what products shold be sold, the spokesman said.

As a successful pioneering effort in on-line versus batch processing operations at Emery, the order entry and billing system will be used as the basis for on-line operations in other areas and divisions of the company. A full range of other accounting and management information systems are also handled in Emery's DP department, the spokesman explained.

Consolidation Brings Savings

(Continued from Page 45)

approximately the same cost as a 168-1, significant cost reductions should be realized as the 60% to 70% capacity level in a dual 3033 center is reached. This, in effect, gives an improved price/performance for such an installation.

In summary, the benefits of utilizing remote job processing services on a consolidated host center to a firm that has an underutilized computer, or has a full installation and needs additional processing power, can be very substantial in areas such as:

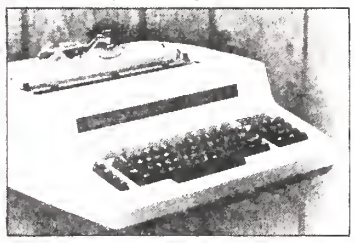
- Reduction of capital investment/-outlay.
- Reduction in monthly operating cost.
- Ability to get more functions (i.e., TSO, IMS).
- Improved programmer productivity through use of TSO.
- Speed of computatation.
- Help in tying together geographically dispersed divisions of a firm with common access to files (both scheduled work and checkout work).
- Ability to utilize the data base system of the host without extensive investment of internal equipment/staff.

Tieszen is operations/technology manager responsible for computer processing services long range planning at Martin Marietta Data Systems.

AGILE IS HERE

First Agile A1 Sighting Reported

Rejoicing throngs fill streets



Excitement swept the populace recently as word of the first sighting of the Agile A1 daisy-wheel terminal was flashed throughout the metropolis. The A1, reported to be the first in a long line of microprocessor-based terminals to be offered by Agile, arrived from the firm's large new manufacturing facilities in Sunnyvale, California. A large production run for inventory was said to account for the immediate delivery of the terminal.

Early dispatches reported that every A1 terminal undergoes long burn-in at high temperature to assure purchasers of reliability. Inspection of the unit by your trustworthy reporter (which was hampered by the capering multitudes) disclosed that the A1 features a Selectric-style keyboard with illuminated function lights.

Rumors that the huzzahs of the citizenry caused a horse to bolt on Third Street were found not to be

Correspondent reports

26 Agile Service Centers Announced

A network of 26 service centers has been established throughout the Nation to provide care for Agile and GenCom terminals, according to late reports. All centers stock parts for both kinds of terminals, including the **GenCom 300A, 300D,** and **300Q** machines. Centers in the major metropolises are staffed by Agile personnel, while the outlying Territories are served by carefully selected independent companies that are experienced in dealing with the Natives.

In an interview with Mr. R. Bullene, who identified himself as Agile's national service director, your correspondent elicited the following: "It's one thing to have an agreement for national service. It's quite another to have the necessary support in place. We're ready to provide service almost anywhere in the country."

Mr. Bullene solicited direct inquiries via the new electric telephone system at (408) 735-9904.

Exclusive!

Agile Optional Features Revealed

This chronicle has obtained a compendium of the optional features available with the Agile A1 terminal:

- ◇ Justification mode, which allows the terminal to produce perfect justified text. Variations in the 1/120-inch inter-word and inter-character spacing result in output of nearly photo-composition quality.
- ◇ A transparency feature allows the printing of all 128 ASCII characters to make debugging and error locating easy.
- ◇ Data compression allows the user to drive a 55-cps mechanism with a 300-baud line.
- ◇ The print enhancement option features automatic overstrike and underscore to produce bold, enhanced printing at high speeds.
- ◇ Hardware options include special keyboard configurations, 45- and 55-cps mechanisms, and custom microcode features.

Details of Agile's options are too voluminous for this brief treatise, but may be had through contact with the manufacturer.

Variety of lease plans available for Agile A1

Attractive one-year operating leases

Longer-term, high equity plans also offered

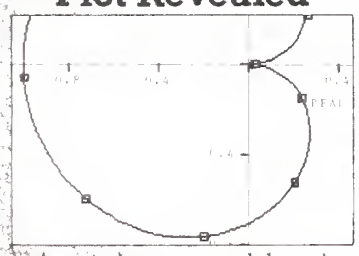
(Story on page 6, col. 3)

Immediate Delivery!!!

Agile promises shipment on receipt of order.

(Story on page 2, col. 4)

Fiendishly Clever Plot Revealed



A conspiracy to speed data plotting for science and business has been brought to light with the uncovering of the Agile Plot Support Package. More to follow.

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Agile A1 will appear at the Interface West Show November 1, 2 and 3.

Mini Bits

IBM Users Group To Hold Seminar

YORK, Pa. — The Central Pennsylvania System/3 Users Group is holding a seminar and exposition Nov. 1-2 in Hershey, Pa., according to a spokesman for the group.

For information, contact Terry C. Prowell, Central Pennsylvania System/3 Users Group, P.O. Box 361, York, Pa. 17405.

Interface West Set for L.A.

LOS ANGELES — Interface West, to be held here Nov. 1-3, will focus on data processing options for small businesses, according to a conference spokeswoman.

The conference will focus on in-house computing, sharing time with other companies and using service bureaus. Exhibits on applications software, small systems, mini/micro peripherals and word processing systems will also be offered.

Registration for the conference is $75. Information is available from 160 Speen St., Framingham, Mass. 01701.

Lessor Offers DEC Units on Rent

PHOENIX — Manufacturers Lease Plans, Inc. (MLP), a leasing firm, has a rental plan for Digital Equipment Corp. users.

The rental plan covers the high end of the DEC Datasystem 350 series and most of the DEC Datasystem 500 products, MLP said. One, two- and three-year terms are available.

MLP must add some value to the system in order to provide the rental plan, a spokesman explained, but this value may be in the form of training or something similar.

A DEC Datasystem 357A with 128K bytes of MOS memory, programmer's console, Decwriter II console, 14M-byte RK06 disk drive and controller, memory management bootstrap loader and CTS 500 software costs $1,899/mo on the one-year plan, $1,740/mo on the two-year agreement and $1,530/mo on the three-year plan, not including maintenance.

That system would cost $52,750 from DEC, the spokesman said.

MLP can be reached at 3443 N. Central Ave., Phoenix, Ariz. 85012.

Correction

The name of the system from Micro Business Applications, Inc. [CW, Sept. 19, p. 59] is the Micron-740. The system was designed for industrial manufacturers and wholesale distributors. The company can be reached through P.O. Box 2888, La Jolla, Calif. 92038.

For Dispersed DP

Datapoint Has 32K Mini

SAN ANTONIO, Texas — The 1500 dispersed processing system introduced recently by Datapoint Corp. is a 32K minicomputer with a CRT and 500K bytes of diskette storage, programmable in the firm's Databus business programming language, with a price tag of $5,950.

The system runs under a diskette operating system that allows two operations such as data processing and print spooling to take place concurrently. The CPU and memory for the system are contained on a single printed circuit board, Datapoint noted.

Designed for use in both stand-alone and distributed data entry applications, the 1500 contains integral communications interface facilities to support emulation of the IBM 3780. Using the 3780 protocol, the system can communicate at speeds up to 4,800 bit/sec with either an IBM mainframe, 3780 terminal or other Datapoint processor running in the same emulation mode, the company explained.

The system can also communicate with a central Datapoint processor under the company's Datapoll communications package. In this mode, the 1500 would act as a slave processor.

The keyboard for the system has a basic 55-key alphanumeric group, 10-key numeric pad and five programmable function keys. The CRT accommodates 24 lines by 80 characters and features a green-on-

(Continued on Page 52)

Qantel Unveils Business CPU

HAYWARD, Calif. — Qantel Corp. has unveiled a business system designed to serve as a stand-alone system for entry-level users or as a host or satellite processor in a distributed processing network.

Called the Model 210, the system includes a CPU with 16K bytes of user-accessable memory, floppy disk drive and CRT. Built-in expansion space for additional communications, increased memory and storage capacity as well as I/O devices are available.

The 210 is compatible with all of Qantel's larger systems at program development, system software and application software levels, the firm said.

The CRT console features horizontal and vertical rotation and a separate keyboard with alpha and numeric pads. This is connected to the CPU with a 4-ft cable. The entire system weighs 60 pounds.

Expanded, the system can accommodate more memory, any of three hard-copy printers and synchronous and asynchronous communications.

Each I/O controller for the system includes a microprocessor and two memories. This design is said to enhance overall computing efficiency by enabling the CPU to perform multiple jobs simultaneously.

The floppy drives for the system use single-sided media with double-track density and use a servo-controlled linear actuator.

With the addition of asynchronous communications facilities, the system can transmit data to other 210s or Qantel's 950 and 1400 systems. The systems can also communicate with other manufacturer's equipment, the company added.

A system with 48K bytes of memory, integral CRT, 1.3M bytes of disk storage, and including a foreground/background operating system costs $11,950. Qantel can be reached at 3523 Breakwater Ave., Hayward, Calif. 94545.

Small System Supplies Savings

By Esther Surden
CW Staff

WARREN, Mich. — A small business system running a specialized applications package is supplying savings to Wholesalers Supply Co. here.

"We came into the whole thing through the back door," DP manager John Hegener explained. "What we were really looking for was software that was compatible with our particular operation." Thus, the firm's initial search for a small system covered software packages that suited automotive wholesaling.

The company which performs DP for several related firms, looked at all the standard packages offered by Honeywell Information Systems, Burroughs Corp. and IBM. It narrowed the field to either a package that Burroughs had to run on its equipment and one from Computer Resources that ran on a small Honeywell system of America, Inc. (CRA). "We basically decided on CRA because it was readily adaptable to an automotive warehouse situation," Hegener said.

The distribution management application at Wholesalers covers order entry, billing, inventory control, purchasing and receiving. When a customer calls into the company with an order, that order is keyed into the system via CRTs and a packing slip is

(Continued on Page 52)

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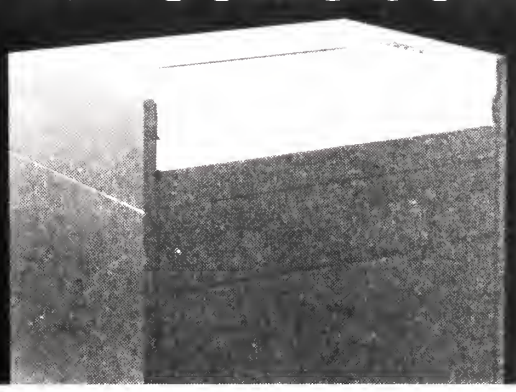
P.S. You can also go Continental by up-grading your IBM Systems 3 with our 400 and 750 LPM models. For the new Series 1, we offer greater cost/performance than IBM.



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Interdata Minis Get Tape Control Board

ANAHEIM, Calif. — A single-board magnetic tape controller for Interdata, Inc. minicomputers is available from Western Peripherals, Inc.

The TC-140 features software compatibility with existing Interdata operating systems, the firm claimed.

The plug-in board is a dual-density controller with interface and formatting electronics for both phase encoding (PE) and NRZ.

It is said to be compatible with the current Interdata family of computers, as well as with some of the earlier series. Fully embedded, the controller requires no separate chassis or power supply and operates via the selector channel or multiplexer bus, the vendor said.

Up to four drives can be handled by the unit in any combination of 7-track NRZ, 9-track NRZ, 9-rack PE or 9-track PE/NRZ, at any two speeds in the range of 12.5 in./sec to 125 in./sec.

The controller also features an extended command register and an enhanced status register, the company noted.

The controller costs $3,100 from Western Peripherals, Inc., 1100 Claudina Place, Anaheim, Calif. 92805.

Printer Outputs 120 Char./Sec

HUDSON, N.H. — Centronics Data Computer Corp. has expanded its 700 Series of serial dot matrix printers with the introduction of a 120 char./sec Model 702. This printer is designed for use in distributed processing and small business applications, the company noted.

A 132-column, bidirectional impact printer, the 702 features a standard 7 by 7 dot matrix pattern. Other patterns optionally available include 5 by 7, 9 by 7, 7 by 9 and 9 by 9, the firm added. Ten characters are accommodated in each horizontal inch.

The printer will be available during the fourth quarter and costs $2,145 from Centronics in Hudson, N.H. 03051

Controller Fits DG, DEC Minis

LAFAYETE, Calif. — Zeta Research has a microprocessor interface graphics controller that plugs into the backplane of a Data General Corp. Nova or Eclipse or a Digital Equipment Corp. PDP-11 mini.

The controller costs $2,500 from the firm at 1043 Stuart St., Lafayette, Calif. 94549.

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Turnkey Based on Series/1

WESTPORT, Conn. — Compudata Systems, Inc. has a turnkey system, based on the IBM Series/1 minicomputer, designed for first-time users or for multiple system users in distributed processing networks.

The system includes IBM's real-time operating system. The programming language for the system is Compudata's implementation Cobol, the company noted.

Basic hardware includes a 64K-byte processor, 9.3M bytes of fixed disk, a 500 K-byte diskette, a 120-char./sec printer and a 1,920-char. CRT. The system can accommodate additional disk drives, multiple CRTs, faster line printers and data communications, the vendor said.

Standard features include CRT input and inquiry, multiple job processing, simultaneous operation by multiple operators, menu job selection and on-demand printing, Compudata said.

The basic Series/1 with application programs for general accounting and on-premise training by Compudata costs $41,000. IBM will maintain the system through its nearest service center, Compudata said from 772 E. State Street, Westport, Conn. 06880.

Hard copy made easy.

With the help of a high-speed microprocessor, Hewlett-Packard combines exceptional performance and convenience in a new low-cost printer and printing terminal.

The HP 2631A printer and HP 2635A printing terminal with alphanumeric keyboard are the first members of a new Hewlett-Packard family of hard copy terminals.

Each machine was designed to give you a number of high-performance features. And both can support a variety of interfaces, including RS232 and CCITT.V24, to fit into systems made by HP and other manufacturers.

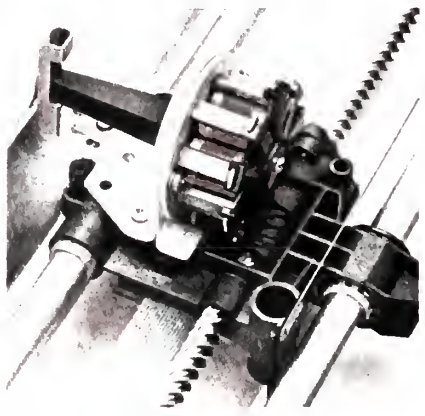
Bi-directional printing increases throughput. Both printers zip along at 180 cps in both directions, depending on your line layout. The microprocessor chooses the quickest path, and increases the speed even more by suppressing leading and trailing blanks.

High-speed slew for columnar data. When the microprocessor senses more than ten blanks in a row, it slews the print head at 45 inches per second to the next print position.

Three ways to print. The Character Compress/Expand Modes let you print more data on a page and emphasize points with headlines and titles. You can get as many as 132 characters on an 8-inch line, or 227 on a 14-inch line.

High-quality print, with six copy resolution. A 7 x 9 dot matrix (versus the usual 7 x 7) gives you clear, crisp printouts, right down to the sixth copy and meets the 128-character USASCII standard. And the extra two dot rows allow true underlining and descenders without character blurring.

Programmably interchangeable character sets. The HP 2631 can be made to print alternate character sets without reconfiguring the printer.



Long lasting, quick change print head saves service calls. The 9 wire print head is conservatively rated at a 100 million character life-span. It's also self-aligning. When you finally replace the head, you can do it yourself in a couple of minutes.

Long-life cartridge ribbon for a clean change. With a life span of at least 10 million characters, this innovative drop-in cartridge takes the mess and trouble out of ribbon changes.

Self-test for quick status checks. One key tells you if the printer is ready to go. If it isn't, the self-test feature helps you isolate the problem, reducing the time and cost for repairs.

Run everything under program control. All the features described and more can be programmably controlled. The software can take you in and out of the various modes. Or you can make a change yourself using one of the front panel switches or keys.

In a network or as part of a stand-alone system, HP now makes it simple to get the hard copy you need. If you'd like to see our printer or printing terminal in action, call the Hewlett-Packard sales office listed in the White Pages and ask for a computer systems representative. Or send us the coupon.

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4670IHPB2

PDP-11/70 Gets Add-On

ENGLEWOOD, Colo. — Monolithic Systems Corp. has introduced an add-on memory for the Digital Equipment Corp. PDP-11/70 that provides up to 2M bytes in a self-contained unit.

Designated the MSC 3602, the memory is expandable in 64K-byte increments to 4M bytes with an additional 5.25-in. chassis, the firm said.

The MSC 3602's access time of 500 nsec and cycle time of 700 nsec permit use of the PDP-11/70's memory bus at the maximum data rate, Monolithic claimed.

Error correction control circuitry is employed to provide one-bit error correction and two-bit error detection. A maintenance panel provides visual monitoring.

The MSC 3602 costs $9,525 for 128K bytes. Monolithic is at 14 Inverness Drive East, Englewood, Colo. 80110.

Persci Has Disk Units for Minis

W. LOS ANGELES — A series of IBM-compatible mass storage systems for minicomputer applications has been introduced by Persci, Inc.

The systems, with data capacities to 1M byte formatted, incorporate a dual diskette drive and are available in a variety of configurations:

• A one- or two-drive (two- or four-spindle) system with microprocessor-based controller, power supply and cabling enclosed in a 19-in. rack-mountable chassis.

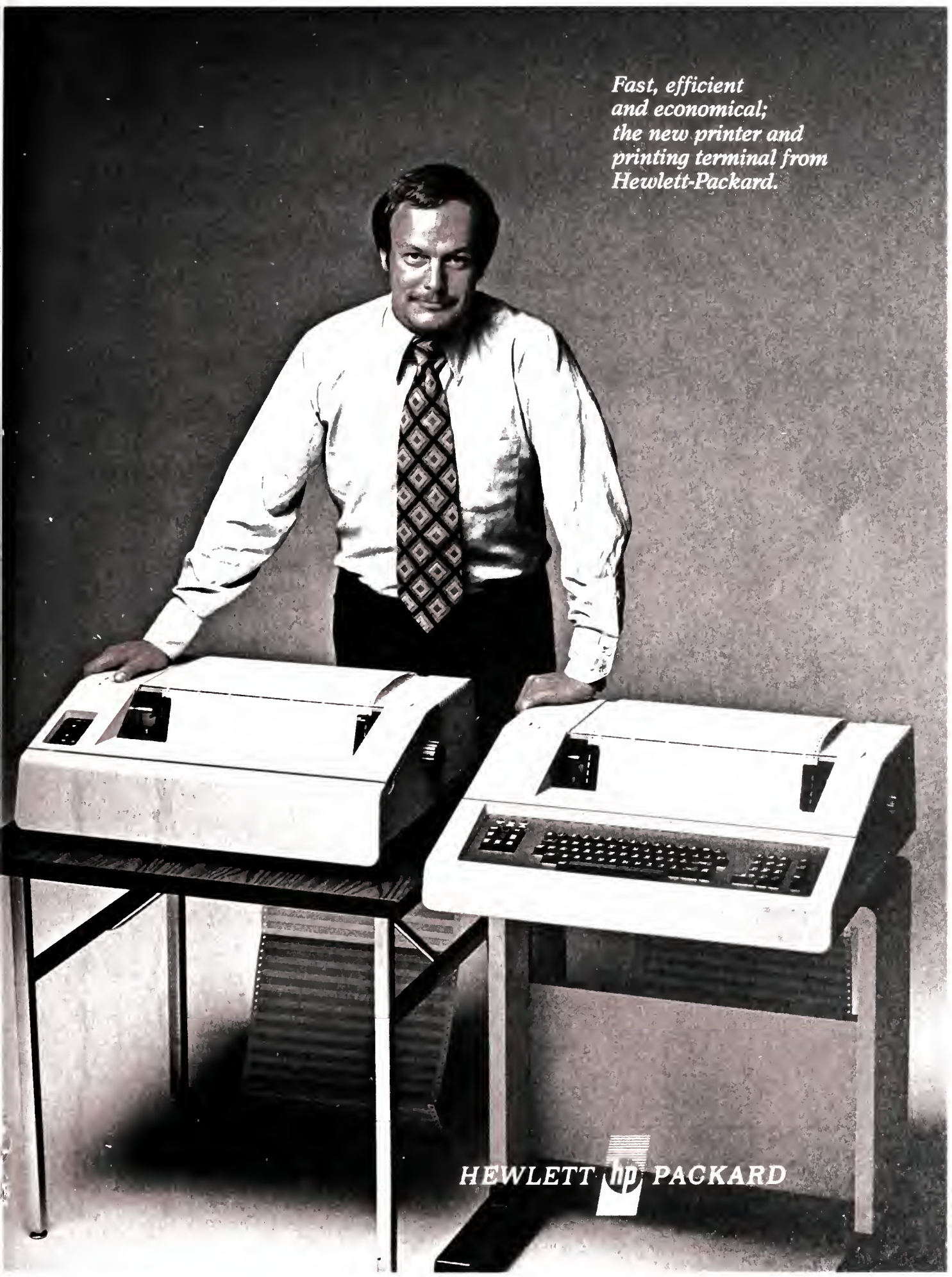
• A one- or two-drive system with power supply and cabinet but without the controller.

• A "slimline" system measuring 4.5 in. wide when vertically mounted that incorporates one dual drive (two spindles) and a power supply in a table-top chassis.

The controller, which can be incorporated in the two-drive configuration, is also available separately for mounting in the host, the firm said. It includes an 8080-type microprocessor and has an internal disk operating system in firmware.

A two-drive system with controller costs $3,995; a one-drive system with controller is priced at $2,895; the two-drive system without controller costs $2,760; a one-drive system without controller is $1,630; the single-drive "slimline" system costs $2,110; and the controller alone is priced at $740.

Persci is at 12210 Nebraska Ave., W. Los Angeles, Calif. 90025.



HP System 45 Expands to 64K For Non-DP Uses

PALO ALTO, Calif. — Designed for scientific, materials management and other non-DP uses, the 9800 System 45 from Hewlett-Packard Co. is a desktop system programmable in Basic.

The System 45 includes 16K bytes of memory expandable to 64K bytes; about 13K bytes of this is not user-accessible, HP noted.

Incorporated in the system is a CRT that provides both graphics and alphanumeric displays. In the graphics mode, the system includes a 560 by 455 dot matrix "with no perceptible flicker," the company claimed.

Split Screen

In alphanumeric mode, the screen is split, offering an 80-character wide, 24-line deep display.

The top 20 lines are dedicated to output in the form of user data, program listings, etc., while the bottom four are used for prompting and diagnostic signals, the firm said.

The keyboard for the system has separate groupings of keys for program control and editing, CRT control and 32 user-definable functions.

A 210K-byte tape cartridge system is standard with the system.

The 75-lb system costs about $12,000 for 16K bytes of memory, CRT and keyboard and one tape transport, HP said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

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Mini Seen Helping Thrift Institutions Compete

BOSTON — Minicomputers are gaining wide acceptance by small thrift institutions, according to John M. Thompson, vice-president of Index Systems, Inc.

Speaking at the National Association of Mutual Savings Banks Conference on Minicomputers here recently, Thompson told the group that the reason minis are finding their way into the thrift business is threefold.

First, because of increased competition for consumer deposits from commercial banks and credit unions, thrift institutions have had to "adopt a more aggressive marketing posture," he stated.

"Never before has it been so important to be able to cross sell to your existing customer base. A comprehensive customer information file with the ability to target customers by tapes is the required system to support an effective cross selling program," he noted.

Second, increased regulatory activity has led to new services such as NOW and checking accounts. Institutions must track the profitability of each of these products and services by responsibility and cost center to evaluate profit effectiveness.

A third reason is "new technology has made it possible for other financial institutions to enter your marketplace where they have never competed before," he pointed out.

The threats have led to three different systems which suit the three different situations, Thompson stated.

Most of the thrifts venture into in-house DP through a financial control system that automates the back office, thus producing management reports by responsibility center that show variances against budget.

This "first building block to provide financial control and to measure where you are making and losing money" usually includes general ledger, budget and responsibility accounting, securities accounting, portfolio management and fixed-asset accounting applications, he noted.

Users can then expand that mini with more disk, memory and terminals to provide a customer information file for marketing support, Thompson continued. In this application, the mini can be used in conjunction with a service bureau to provide the marketing details needed.

The mini is updated nightly with a tape from the service bureau that includes information on new accounts and new balances. The small system "provides you with CRT displays to access all of the account relationships of any household."

The third step using minis brings the entire transaction processing application in-house, replacing the on-line service bureau.

System Handles Dispersed DP

(Continued from Page 49)

black screen. An inverse video feature can be programmed to highlight special fields, the firm noted.

The diskette drive uses IBM-compatible media and includes a "drive in use" warning light to alert the operator when a diskette is currently being accessed by the processor.

The system is programmable in both the Databus language and Dataform, a data entry language.

The 1500 "will fit in practically any office environment," Datapoint noted, but a dusty or particle-laden atmosphere must be avoided as the contaminants could cause floppy disk media damage. Information is available from the company at 9725 Datapoint Drive, San Antonio, Texas 78284.

Small System Brings Savings

(Continued from Page 49)

generated. From the packing slip the order is pulled and is shipped to the customer. An invoice is then generated.

Inventory for all items is kept on the system. Inventory is updated daily and the inventory module interfaces with purchasing and receiving operations. An inquiry system allows the firm to answer questions from all of the major files, Hegener added.

The small Honeywell system also performs payroll, payables and general ledger applications for several companies owned by the holding company that owns Wholesalers Supply.

Hardware for the system includes a Honeywell 62/60 with 256K of memory, four disk drives, one 800 line/min printer, one read-only printer and seven CRTs. The CRTs are scattered throughout the billing, purchasing and order desk areas.

Hegener credits the small system and its software with a number of savings.

"When we worked with the service bureau, the billing and updating of customer accounts was continually a week to a week and a half behind."

"Now we are able to get statements to customers prior to the first of the month; therefore, we have increased our cash flow with the bulk of our cash now received a week to a week and a half earlier than before," he said.

Another improvement credited to the system is better turnaround on the inventory. Because inventory files get updated faster, management has more current information, he noted.

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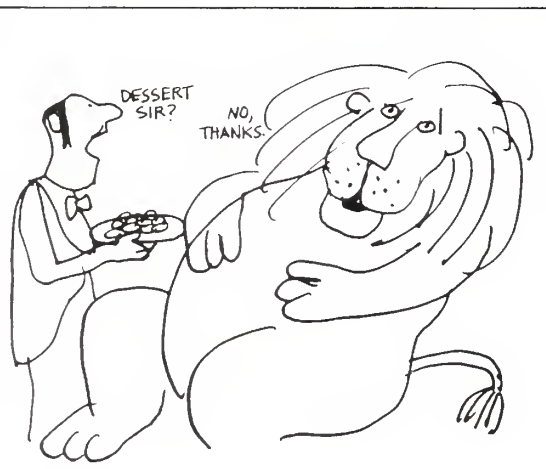

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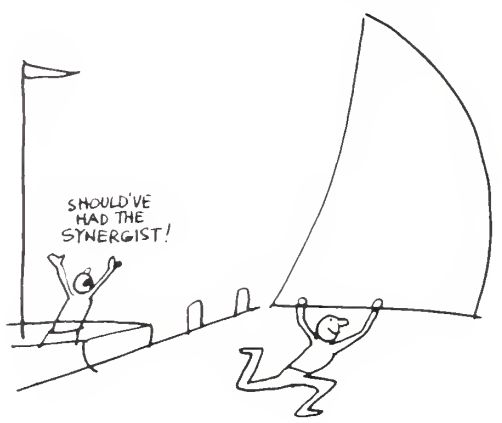

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A multiple choice quiz on Keybatch.

A multifunction data entry system from Data 100.

(WARNING: there may be more than one right answer to each question)

---

1. Keybatch is:

(a) a multifunction intelligent key-to-disk data entry system.

(b) a brand new multifunction system from Data 100.

(c) a multifunction system which supports high volume concurrent batch capabilities.

2. Keybatch is also:

(a) a multifunction system offering stand-alone RPG for expanded user flexibility.

(b) a multifunction system that can operate with on-line file inquiry capabilities (3271 compatible) via common keystations for both data entry and on-line file inquiry.

(c) a system capable of handling mail sorting and other office tasks.

3. As a data entry system:

(a) Keybatch has up to 20 megabyte disk storage capacity.

(b) Keybatch is proven with approximately 900 units now in use.

(c) Keybatch can be configured with 2 to 16 keystations.

4. For the end user:

(a) Keybatch meets short range goals such as appreciable dollar savings.

(b) Keybatch provides for long range system growth.

(c) Keybatch offers both of the above.

5. For more information on Keybatch, you should:

(a) search frantically through your EDP literature files.

(b) write Data 100 at 6110 Blue Circle Drive, Minnetonka, MN 55343.

(c) call your nearest Data 100 sales office or one of the numbers we've listed.

Are you a multifunction expert? Check these correct answers.

All answers but four are correct

1b Keybatch isn't brand new, was introduced in 1974.

2c Sorry, Keybatch can't do everything

3b There are actually 1500 Keybatch systems on the job worldwide.

5a No need to search when we're so easy to write or phone. Do it now

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Strategies — Part 2

Sites Need Thorough Check Before Optimizing

Special to CW

In order to optimize job mix, processing throughput and user response time during each shift, the DP manager should look closely at on-line systems, time-sharing and remote terminal use.

On-line or time-sharing systems applications must be reviewed to establish their environmental characteristics; that is, the input/output nature of these applications should permit small program sizes that are dynamically called.

The use of remote terminal minicomputer systems by programmers has helped to decrease total systems development time and increase productivity. However, like the production environment, if loose discipline and minimal supervision exist, then abuse will follow and development efforts will adversely affect the minicomputer production environment, both time-sharing and batch processing.

The concept of remote terminal program development instead of batch card program testing with program listings should be rigidly enforced during prime shift. This standard will greatly increase minicomputer program testing capacity, without detracting from the overall productivity of batch processing.

What is system overhead? What is good, bad, excellent, unsatisfactory, etc. percentage of total workload assigned to system overhead? These questions are difficult to answer. Does it include all rerun time or only the portion attributable to system error?

This is the final half of a two-part series on objective methods to measure and evaluate current and planned minicomputer operations and systems development activities. The article was prepared by the marketing department of Data General Corp.

Does it include preventive maintenance time? How is it measured — percentage of CPU cycles, core, external storage, etc.? You can, of course, hire a hardware/software monitoring company to define it.

While such classifications of current workload are helpful in gathering necessary data and evaluating current demands, the overall throughput of the system must be the most important consideration, that is, measurement of "responses" and reports generated each day.

The key to planning future workloads lies with the user departments. They can identify their needs for new systems on the expansion of current systems over the next several years. A priority list of required systems to be developed and information reporting or inquiry requirements should be created with the user departments.

Capacity of a system is determined by three characteristics which limit computer process time: space, occupancy time and user time in a system's resource. There must be enough space in a minicomputer site's resources to accommodate the workload.

If space in memory and auxiliary storage is available, it must be available for enough time to satisfy processing requirements. If enough occupancy time is available, enough use time in resources must be available to allow satisfactory processing of workload. Whichever of these factors "runs out" first sets the system capacity at the level of processing which caused that shortage.

Manipulating Capacity

Capacity can be manipulated by making changes in the job stream, making changes in the hardware, altering the amount of capacity "spent" on overhead or changing installed hardware or staffing levels at the minicomputer site.

Interviews with user departments and direct observation of terminal response times for on-line or time-sharing systems should be conducted to determine system response times. Batch data input workload arrival times (from user departments) at the minicomputer site should be logged daily.

The average batch input arrival time should be calculated for the current month and entered on a "timeliness." form. Integrating on-line system response times and batch input arrival times with processing time yields a good picture of the user departments' time requirements for minicomputer processing.

Overall performance measures are used to describe the processing characteristics of the minicomputer site as the user seem them. These are expressed in terms of data input workload, terminal data entry-data base inquiry and update, and report processing output.

Since people are part of the resources in a DP site, further measures are obtained through use of time records, manual data logging, manual systems and data input job function, systems and workflow analysis.

Collection and reporting of overall performance measures may require implementation of special logging procedures. As system resources are altered both the overall and system performance measures change.

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If you're unable to attend the ACM conference, to apply for a position please send your resume, including salary history, in confidence to Jim Stewart, Data General Corp., 15 Turnpike Rd., Westboro, MA 01581.

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Programmable Calculators: Two Views

• Offer Many Challenges

By Frank Vaughan
CW Staff

SAN FRANCISCO — "For the hobbyist, the new [programmable] calculators offer new challenges in tricky and elegant programming techniques and perhaps the joy of discovering features and uses of the calculator that were never intended by the manufacturer," a paper presented here recently said.

The paper was presented by Rex H. Shudde of the Naval Postgraduate School, at the 1977 Western Electronic Show and Convention (Wescon).

From an advanced user's point of view, two of the most important features in personal programmable calculators are the number of program steps and the number of available storage registers, Shudde stated.

Number of Steps

"The number of program steps is important, for with more steps it is possible to create programs of ever increasing complexity and capability.

"The number of storage registers is important, for with more registers the ability to handle larger amounts of data is increased. An example is the solution of simultaneous linear equations; a system of n equations in n unknowns requires the use of $n(n + 1)$ storage locations for just the coefficients and constants, and additional 'scratch' storage is required for intermediate computations," he noted.

Broad Spectrum

There is a broad spectrum of possible user applications and requirements which can be satisfied by the latest models of programmable calculators, he said. With many applications problems the user does not need to know how to program the calculator, what is needed is a collection or library of programs that can be used to perform the required computations, he noted.

"For the scientists and engineers who perform varied computations in their research and work, the latest generation of calculators offer increased computational capability.

"This increased capability can mean increased convenience, decreased reliance on a centralized computer system and faster turnaround time in obtaining solutions to complex problems," he concluded.

• User Groups Needed

By Frank Vaughan
CW Staff

SAN FRANCISCO — There is a real need for personal programmable calculator (PPC) user organizations to act as a communications focal points for PPC users to share applications, according to a presentation made here recently.

The presentation, "Calculator Users of the World Unite to Develop Advanced Applications" was made at the 1977 Western Electronic Show and Convention (Wescon) here by Richard J. Nelson, an applications engineer with Statek Corp.

Because of limited publicity, the clubs have grown with the general PPC population to remain with membership of about 1% of total PPC users. The real reason why the clubs don't grow proportionately larger is unknown, he said.

One reason may be that the PPC clubs are composed of talented and advanced users and the average user is overawed at the seemingly complex nature of advanced applications, Nelson indicated.

The greatest reason for the lack of growth is the lack of publicity concerning the clubs. One of the most important things that a manufacturer can do for its user organization is to include the information of the existence of the user groups with each machine they sell, he added.

The era of personal computing started in January 1974 when the first PPC, the Hewlett-Packard Co. HP-65 with external memory was introduced.

"Computer or calculator, users of the HP-65 soon found it had more power and capability than even Hewlett-Packard had imagined. Six months later, June 1974, enough machines had been in the hands of users that had become so skilled in their use of the machine, that Hewlett-Packard was not able to answer their technical inquiries.

Out of the Frustration

"Out of the frustration of not having a ready source of information on the HP-65, the HP-65 Users Club was formed. From this seed grew numerous groups and ultimately a Council of Personal Programmable Calculator Users Organizations.

"The systematic publication of machine anomalies, programming techniques and applications quickly advanced the PPC state-of-the-art. The enthusiasts that joined these groups developed and published applications and techiques that became well known and published nine to 12 months later in the conventional technical literature.

The applications these advanced users developed made their machines perform unconventionally and when the uninformed user asked the manufacturer about these applications, he was often told that 'it can't be done,'" Nelson explained.

Today, Nelson contends, the situation is different; all manufacturers of PPCs recognize the accomplishments of these advanced users and even recommend that their customers consult them when the manufacturers receive questions that they cannot expend the time, manpower or resources to answer.

Examples of the accomplishments of PPC user groups that Nelson discussed included a correction card that allows HP-07/97 program cards which have been write-protected to be rewritten on; keyboard overlays that permit the input or output of alphabetic information; use of non-normalized-numbers; display words and graphics and black boxes.

"The PPC presents a challenge to its user. Because it is so powerful it serves its owner as more than just a problem solver. Advanced applications developed by PPC users organized to share programming techniques, software and applications help the PPC club member make maximum use of hardware, Nelson concluded.

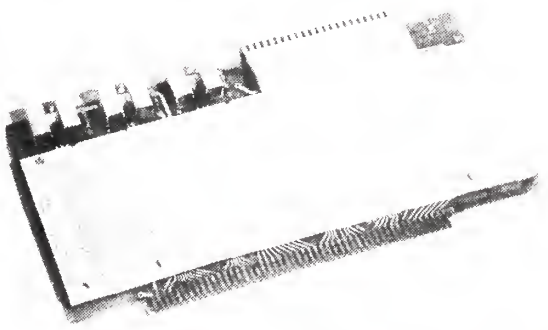
S-100 Breadboard Card Offered

DERBY, Conn. — E&L Instruments, Inc. here has introduced a universal breadboarding card for interfacing S-100 Bus microcomputers with peripheral devices or experimental circuitry.

Lines on the S-100 card are divided into address, data and control sections, and the user has access to every signal generated by the microcomputer, a spokesman said. Each card is equipped with three voltage regulators, +5V +12V, and -12V as well as with points for obtaining unregulated voltage.

The card is 5 in. by 10 in. and has 50 double-sided gold plated contacts on one edge for interconnecting with the microcomputer and 22 contact on the opposite edge for interfacing and breadboarding.

The S-100 card costs $75 and is available from E&L at 61 First St., Derby, Conn. 06418.



The E&L breadboard card interfaces S-100 bus systems with peripherals or test circuits, features three voltage regulators and boasts gold-plated contacts, the firm noted.

'Best of' Hobby Reading Published

MORRISTOWN, N.J. — Hobbyists interested in some varied reading on different aspects of their hobby might be interested in four different publications from the Creative Computing Library.

The Best of Creative Computing, volumes 1 and 2 combine to bring the best of the articles, fiction, foolishness, puzzles, programs, games and reviews from the first two years of *Creative Computing* magazine, according to a spokesman.

The Best of Byte, volume 1, contains the majority of the material in the first 12 issues of *Byte* magazine. A large portion is devoted to hardware, software and applications, and some attention is given to theory and where the computer hobby is heading, the spokesman said.

Jokes and Gibes

The Colossal Computer Cartoon Book contains 15 chapters of jokes, gibes and cartoons about the world of computers, he added.

The Creative Computing volumes sell for $8.95 each, the Byte volume goes for $12.95 and the cartoon book sells for $5.95 from Creative Computing at P.O. Box 789-M, Morristown, N.J. 07960.

Upgrade Kit Converts Poly 88

SANTA BARBARA, Calif. — Polymorphic Systems, Inc. has introduced an upgrade kit for users of its Poly 88 microcomputer system. The kit will convert the Poly 88 into a System 8813 diskette-based system.

The kit contains all mechanical parts and electronic assemblies necessary for the upgrade, the firm said. The kit includes chassis, cabinet, 10-slot backplane, power supply, floppy disk controller, 2K bytes of read-only memory (ROM), a fan, one floppy disk controller and two system diskettes.

The conversion reportedly takes only a few hours to complete. The Poly 88 Disk Kit is priced at $1,450 and up to two additional disk drives can be added at a cost of $590 each. The firm is at 460 Ward Drive, Santa Barbara, Calif. 93111.

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Hobby Havens

As a service to hobbyist readers, Computerworld *periodically will list the micro clubs in different parts of the country.*

Clubs wishing to be included in this listing should send their name and address or telephone number of a contact person to Frank Vaughan at Computerworld, *797 Washington St., Newton, Mass. 02160.*

CANADA

Niagara Area Computer Club. Contact: John Youngquist, Box 122, Fort Erie, Ontario, Canada.

Toronto Region Amateur Computer Enthusiasts. Contact: Harold G. Melanson, Streetsville Post Office, Missauga, Ontario, Canada.

ILLINOIS

Packard Personal Computing Club. Contact: Jack Stansbeary, c/o Packard Instrument Co., 2200 Warrensville Rd., Downers Grove, Ill. 60515.

Chicago Area Computer Hobbyist Exchange. Contact: Bill Precht, 1102 South Edison St., Lombard, Ill. 60148.

INDIANA

Louisville Area Computer Club. Contact: Andy Ehalt, 115 Edgemont Drive, New Albany, Ind. 47150.

Hoosier Amateur Computer & Kluge Society. Contact: Ray Borrill, 111 South College Avenue, Bloomington, Ind. 47401.

Valpo Tech Microcomputer Society. Contact: Arthur Hershman, Valpariso Technical Institute, Valpariso, Ind. 46383.

Calumet Computer Tribe. Contact: Ray Seiden, 6825 Ridgeland Ave., Hammond, Ind. 46324.

Indianapolis Small Systems Group. Contact: Mike Sanderson, 2201 West 79th St., Indianapolis, Ind. 46260.

Summit City Computer Club. Contact: Stuart Brown, 3534 South Barr, Ft. Wayne, Ind. 46806.

MICHIGAN

Southeastern Michigan Computer Organization. Contact: Jim Rarus, 15377 Veronica, East Detroit, Mich. 48021.

Lansing Microprocessor Club. Contact: Bill Serviss, 13121 Tucker Drive, DeWitt, Mich. 48820.

OHIO

Dayton Microcomputer Association. Contact: Dave Lundy, 1404 Long Island Court, Xenia, Ohio 45385.

Amateur Computer Society of Ohio. Contact: Fred Hatfield, 1372 Grandview Ave., Columbus, Ohio 43212.

Cleveland Digital Group. Contact: John Tucky, 4006 East 57th Street, Cleveland, Ohio 44105.

Cincinnati Computer Club. Contact: Mike Shebesta, 1838 Fireside Drive, Cincinnati, Ohio 45230.

Computer Hobbyists Around Toledo. Contact: Bill Gensbechler, 2227 Portsmouth Ave., Toledo, Ohio 43612.

WISCONSIN

Durant Computer Club. Contact: Jim White, 901 South 12th St., Watertown, Wis. 55094.

Wisconsin Amateur Computer Club. Contact: Don Stevens, Box 159, Sheboygen Falls, Wis. 53085.

MICROCOMPUTING CLASSIFIED EXCHANGE

This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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Profits Masked: McAdams

IBM's Return Outdistances Industry's

By Catherine Arnst
CW Staff

NEW YORK — By adjusting figures in IBM's annual reports, a picture of a company with profits at a much higher level than the rest of the computer industry emerges, according to a government economist testifying in the U.S. vs. IBM antitrust trial.

For the year 1974, IBM's return on investment was 49.3%, according to charts developed by Dr. Alan K. McAdams, the Justice Department's chief economic advisor for this case.

Of the ten other firms analyzed with the same methods used for IBM (Burroughs, Control Data Corp., Digital Equipment Corp., General Electric, Honeywell, NCR, RCA, Xerox and Sperry Rand), the next highest were CDC and Xerox with 33.5% and 33.6% respectively. The other companies ranged from 14.5% to 25.7%.

McAdams drew up a series of charts depicting what he claims is IBM's unique position in the industry. All his figures were derived by what he termed a "simple process" which any financial analyst would do as part of normal business procedure to measure a firm's profitability.

The charts were designed to demonstrate three points the government is trying to make about IBM's alleged monopoly position — that it has a large cash hoard, a fast rate of depreciation when compared to the rest of the industry and only a small percentage of its financing comes from long term debt. These three factors combine to mask IBM's actual return on investment.

An unsophisticated way to measure a firm's profits is to divide the net earnings after taxes by stockholder's equity, he testified. By using this method, IBM shows a 17.9% return on investment in 1975, which, although higher than most of the other computer firms analyzed, is still within a close range. The other companies' percentages ranged from 4.9% for CDC that year to 17.9% for Xerox (Xerox's high profit level can be attributed to the large earnings it obtains in the copying machine market, McAdams said).

McAdams then calculated IBM's cash on hand and marketable securities. A corporation generally does not keep a large amount of these assets because they earn a very low interest rate and are taxed at approximately 48%, he said.

IBM, however, had a $4,708,314,000 in these assets in 1975, he calculated. The company maintains such a large cash hoard in order to finance new product developments, price cuts and leasing arrangements which were in turn often used to contain competition, he said.

In a companion chart, McAdams subtracted out after tax income derived from cash and marketable securities from the net earnings after taxes for all 11 firms in order to determine their earnings on operations only. With this adjustment, IBM's percentage rose to 25.9%, an eight point increase. The other firms remained virtually the same, with only a one point change up or down.

McAdams used another set of charts to illustrate his testimony concerning IBM's fast rate of depreciation used for equipment out on lease. While other firms in the computer industry attempted to make their profits appear higher by using a very slow rate of depreciation, IBM was trying to make its profits seem lower with the opposite technique, McAdams said.

He developed a chart of the 11 manufacturers' cash flow, which is the net earnings after taxes plus depreciation and amortization. The results showed that in 1975, IBM had a cash flow of 32.1%, Xerox had 47.4%, and the other firms ranged from 15.9% to 27.2%.

When income from cash and marketable securities is subtracted out of the net earnings after taxes, IBM's cash flow percentage jumps to 50.1%, while every other firm again stays around the same figure, usually dropping by only one or two points, he noted.

A set of charts was developed to show total capitalization (which is stockholder's equity plus long term debt) by dividing that figure into net earnings after taxes.

In the first chart, IBM goes up one-tenth of a point from the first chart McAdams used, where net earnings were divided by stockholders' equity only (from 17.3% to 17.4%). Most of the other firms used in the comparison dropped by some small amount, although CDC went up 2.8%.

When adjustments are made for the firms for all three items — cash reserves, depreciation and long term debt — McAdams derived the 49.3% figure to show IBM's return on investment in 1974. This is a 31.9% increase from the figure McAdams derived in the first chart he did, which contained no adjustments. The results for the other firms only rose between 4.3% and 19.2% for 1974, according to the charts.

Not only do these figures show high earnings which are the result of a monopoly position in the computer industry, they also show how IBM's accounting techniques attempt to mask that high profitability, McAdams said.

Adapso Pledges to Support Computer Crime Legislation

MONTVALE, N.J. — The Association of Data Processing Service Organizations (Adapso) has indicated it is vigorously supporting the Federal Computer Systems Protection Act of 1977 [CW, July 4].

"We firmly believe that a law which strengthens the government's ability to prosecute computer-related crime, and which permits the imposition of meaningful penalties, is long overdue," Adapso Executive Vice-President Jerome L. Dreyer wrote to the bill's sponsor Sen. Abraham Ribicoff (D.-Conn.).

Under the bill, those who are found guilty of misusing computer systems of the federal government, certain financial institutions and other entities involved in interstate commerce could receive jail terms of up to 15 years and/or fines up to $50,000.

"Such a law would perhaps even more importantly go a long way toward fostering the public confidence in the integrity of computer systems, which is necessary to pave the way for public acceptance of electronic funds transfer systems, elecronic mail systems, and other potential benefits of the full realization of the capabilities of computer technology," Dreyer stated in his letter.

"In our view, strong laws to properly punish actual wrongdoers is a much more efficient and rational approach than needlessly imposing onerous, unproductive and expensive requirements on the entire industry, regardless of culpability or lack thereof."

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CDC Saw Plug-Compatible Market Blossoming

By Molly Upton
CW Staff

NEW YORK — Within a year of embarking on its plans to offer IBM-compatible subsystems, Control Data Corp. upgraded its estimates of that sector's net profits before taxes (NPBT) from $58 million to $139 million for the period 1972 to 1980.

The CDC end user task force observed in its 1972 report that although the area of plug-compatible peripherals was fraught with risks, the mrketing of subsystems or peripheral facilities appeared to offer "greater long-range benefits with less associated risk."

The task force reports, written in 1972 and 1973, were entered as evidence in the U.S. vs IBM antitrust trial here.

The reports indicate CDC expected it could increase its customer base of 1,500 by between 150 to 200 a year by marketing subsystems to end users.

This approach could also give the firm "better insight for system and OEM planning into the trends, needs, etc. of the ultimate marketplace for all of CDC's services through a more direct exposure to that market," according to the 1972 report.

In addition, the first volume of the reports estimated CDC could reduce costs of products and services used in other CDC markets by about $8 million NPBT.

The report recommended that CDC phase out of the direct replacement business and trend toward the subsystem or "peripheral facility."

Specifically, the report recommended that the off-line print station should continue as an OEM product and be announced to all end users in late June 1972 as CDC's first entry into the end user subsystem or peripheral facility segment.

The firm should further define and initiate a plan of action for the peripheral facility, which could yield $38.3 million net profit before taxes on revenues of $140 million between 1974 and 1980, the 1972 report stated.

In phasing out of the direct replacement market, the firm should make no new investment for the development of peripherals solely for this marketplace.

Although CDC's version of IBM's 3330 disk drive in itself represented a "high-risk" program, the report recommended proceeding with the 33301 because the development cost would be borne by an OEM contractor and the unit, along with the buffered 38301, formed the integral part of the peripheral facility.

". . . It appears that we can test the validity of this market for low initial incremental investment," the report said.

CDC should buy the 38301 initially in order to begin shipments in the first quarter of 1973 and minimize initial investment.

The group recommended not pursuing the plug-interchangeable tape market since the firm lacked the physical resources to be "successful with all of the end user programs at the same time." Also, the tape program "contributed least toward the long-term end user goals," CDC said.

CDC's 1972 estimates for profit from the core memory business were overly optimistic.

In 1973, CDC had cut profit estimates from $7 million to $2.9 million.

Sales from the various lines were expected to reach over $60 million in 1974.

The group projected that cumulative cash flow would turn positive in 1978 and cumulative NPBT in 1983.

The objectives were to:

• "Establish CDC as the major supplier of total services (product, maintenance, training, financial, etc.) to the end user market and consolidate planning toward this goal." CDC observed: "Should IBM be restrained from restricting this activity, CDC would be in a position to capitalize on a market potential larger than the mainframers themselves."

• "Decrease CDC systems costs, OEM costs and customer engineering costs through economizing on scale and increased efficiency. Benefits are estimated to exceed $19 million for 1972-1977."

• "Help stabilize swings in CDC systems and OEM business."

The firm should also "aggressively develop 360/370 system and software expertise and resources required to support end user activity."CDC could use these to plan and develop the mass storage concept in conjunction with data entry and terminal facility plans, the report stated.

Looking at current products, directed at the IBM base assuming a 1% to 4% penetration of peripheral products, CDC in 1973 estimated orders should be $105 million in 1975 and $37.3 million in 1980, totalling $550 million since 1972.

But another estimate that included new products saw orders growing to $130 million in 1980. Contemplated new products included: Winchester replacement, 380 memory, enhanced disk drives and tape drives.

IBM Trial Documents

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Need for Competition

Bank Card, EFT Differences Fading: Shenefield

ATLANTA — The Justice Department will keep a close watch on bank-issued credit cards as their capabilities unfold in the context of growing numbers of electronic funds transfer (EFT) systems, its antitrust chief said here recently.

Previously considered only extensions of credit and not able to represent fund transfers, bank cards are now being used by "numerous cardholders" as "a convenient method of undertaking an economic transaction," according to John H. Shenefield, acting Assistant Attorney General of the department's Antitrust Division, speaking before the National Bank Card Convention earlier this month.

The "neat segregation of bank cards from EFT developments may once have been logically defensible, but is increasingly less satisfactory as the lines between the two industries become blurred," Shenefield said.

The introduction of electronic debit or check guarantee cards by the national bank card systems — Visa and Master Charge — will bring these two systems "directly into the mainstream of EFT," he added.

Furthermore, the bank card clearing systems are also potential suppliers for local point-of-sale (POS) clearing networks, Shenefield stated.

Competitive Issues

As a result, "the competitive issues involved in the bank card field are clearly related to the competitive issues presented by EFT," the Assistant Attorney General contended.

Because joint ventures between banks have been a major pattern of organization in these industries, the Justice Department is concerned that inter- and intrasystem competition be maintained in credit cards and developing EFT systems, Shenefield said.

Throughout his address to the National Bank Card Convention, the antitrust head stressed the "uncertainties" involved in the blurring of the line between bank cards and EFT. "Both bank cards and EFT are still in active development. It is too early to be sure we are asking the right questions, much less reaching the right conclusions," he stated.

Shenefield pointed out that even the National Commission on Electronic Funds Transfer (NCEFT), with its final report due to be delivered to the President and Congress next month, has not focused on the competitive aspects of bank credit cards because until very recently, they didn't technically represent fund transfers.

Looking ahead, however, the assistant attorney general noted that "While we now have little cost data or practical experience in the EFT area, the experience in bank cards has been that joint ventures have frequently been used to share the investment and risk-taking necessary to develop national and large regional bank card systems and to obtain their potential scale economics."

Viewed With Skepticism

Because they present opportunities for collusion, joint ventures are viewed with skepticism by the Antitrust Division, Shenefield said. But at the same time, the Justice Department recognizes that "some economic activities cannot be undertaken without cooperation between competitors," he added.

Capital costs and the monopoly characteristics of certain aspects of bank card and EFT systems may necessitate sharing of facilities by competitors, Shenefield stated.

But "in the early years of a new EFT or bank card service, it is of primary importance to give competition between systems ample opportunity to develop, to encourage availability of the widest possible range of products," he told his audience.

"Organizers of an EFT system, therefore, generally should not allow all potential competing operators to join at the onset," Shenefield said. It may turn out that "competition within the system, rather than between systems," may be the real key, he continued.

Shenefield noted that the Justice Department has struggled with the manner in which bank card and EFT clearing systems could or should develop in its business review of the statewide POS system in Nebraska and its ongoing investigations of POS systems in Iowa, Wisconsin and Maryland.

Nonbank Competitors

Beyond specific bank card and EFT system developments, changes in the computer and communications technologies "promise to pit banks against nonbank competitors. We would like to see entry by nonbank as well as bank vendors of EFT system components," particularly in the processing and communications of economic transaction information, Shenefield said.

"To the extent [that] there is vertical integration in an EFT system, such as bank debit card systems where banks also do the processing, there may be pricing distortions, which we want to avoid," Shenefield explained.

Difficult Questions

There are more difficult competitive questions to be found in the question posed by the sharing of bank card and EFT terminals at the consumer or retail level, the Assistant Attorney General stated.

In addition to posing all the problems associated with the sharing of terminal systems, the sharing of terminals also involves the inability of merchants to install an infinite number of independent terminals in any one retail location, he said.

Once again, Shenefield favored competition rather than mandatory sharing as a means of solving this EFT problem. "Merchants will probably demand terminals that will enable them to serve as many customers as possible. Competition in terminal services should therefore lead to voluntary sharing of the terminals," he said.

"Regardless of who installs the terminal in a merchant location, it is important that each service that could be offered through the terminal be independently priced and that the decision to accept each service be left up to the merchant," Shenefield stated.

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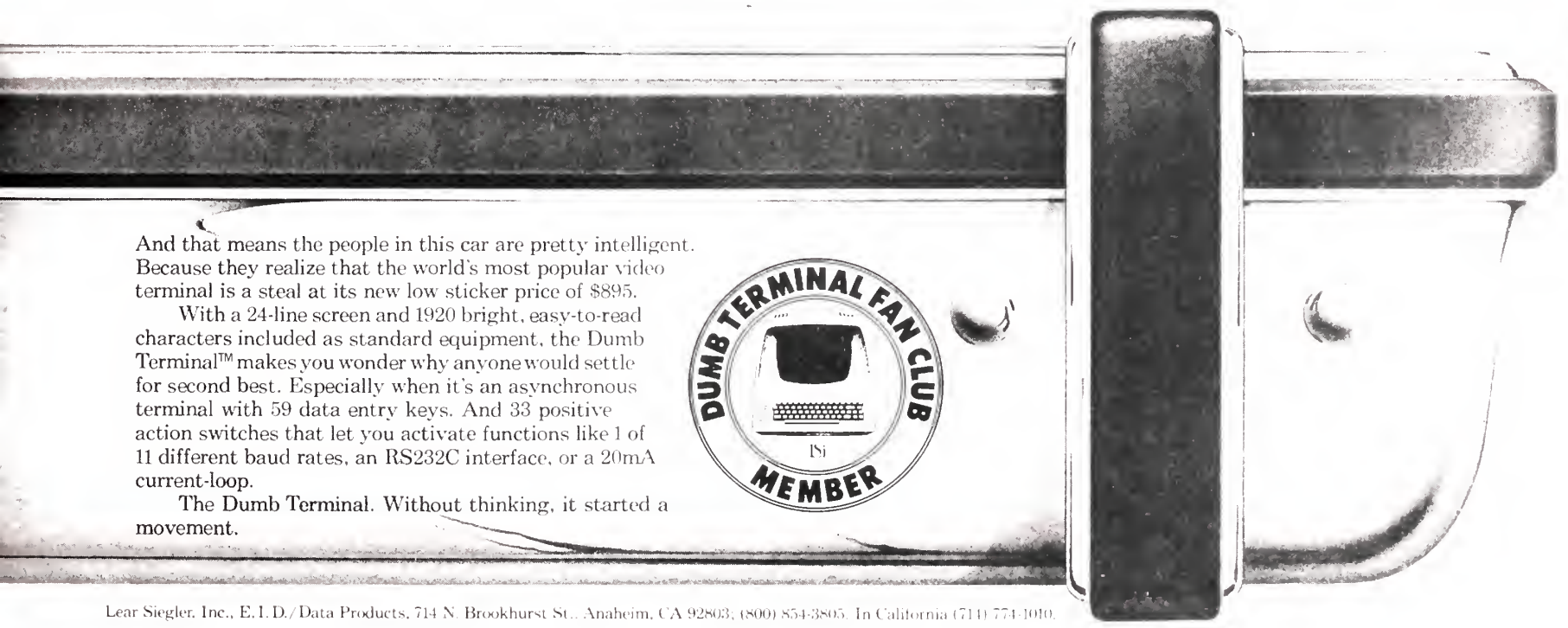

Part & Parcel

Motorola's I.C. Division's MC10803 Memory Interface Function generates memory addresses and provides for the bidirectional transfer of data between a processor subsystem and system main memory or peripheral equipment, the firm said.

By providing arithmetic capabilities at an I/O address output port, the device can unburden the main processor, Motorola said. The MC10803 costs $40 in lots of 100 or more from distributors and Motorola at P.O. Box 20912, Phoenix, Ariz. 85036.

• • •

Monolithic Memory Systems Corp. has introduced a 14M bit memory, the MSC 2601, and a 32K by 16 RAM memory, the MSC 2401.

The 2601 contains its own power supplies, air cooling, timing and control cards, address buffer, termination and register. The unit, built around a 16K by 1 dynamic RAM, can permit addressing up to 8 modules of 768K words, the firm claimed.

It costs less than .25 cent/bit in OEM quantities and fits in a 5.25-in. high chassis, the firm said.

The 2401 is compatible with the Micro 3000 and is powered from a single +5VDC, 2A source, and costs $1,735 in single quantities from 14 Inverness Drive East, Englewood, Colo. 80110.

• • •

Information Magnetics Corp. (IMC) has raised prices 15% on all "Winchester"-type recording head products, specifically the 5636 and 6350 product lines.

Manufacturing costs did not decline to anticipated levels, the firm said from 495 S. Fairview Ave., Goleta, Calif. 93107.

• • •

Sea Data Corp.'s 633M series data acquisition cassette modules are designed for remote use with 12V power sources.

The 633M/8 records 1.2M bytes at 150 byte/sec and has direct memory access mode recording, the company said.

The 633M/12 records .82M words at 100 word/sec, Sea Data said.

The units cost $2,100 and $2,200, respectively, from the firm at 153 California St., Newton, Mass. 02158.

Elographics Sets Position Sensor

OAK RIDGE, Tenn. — The Elographics, Inc. E270 Transparent Pressure-Sensitive Position Sensor is available with electronics, power supplies and cabinetry for use in CRTs.

The sensor is constructed of a plate glass substrate coated with semiconductive metal oxide over which is placed a plastic cover sheet with a transparent conductive coating.

Single quantity prices start at $3,990 from 1976 Oak Ridge Turnpike, Oak Ridge, Tenn. 37830.

OEM Products

Kilobyte Card, Reader Planned

WELLESLEY HILLS, Mass. — A magnetic card reader/writer using a card storing 1K bytes has been introduced by Vertel, Inc.

The Kilobyte card employs four stripes with two F2F channels encoded on each track and is the size of a credit card, the firm said.

The KB-31 Microloader records and reads both channels per stripe on the card in one cycle at 5K byte/min. It cannot be operated unless the card is properly inserted, the firm said.

The Microloader costs $99 in lots of 1,000 without electronics or $258 complete; Kilobyte cards cost about 10 cents each in large quantities. Vertel is at 167 Worcester St., Wellesley Hills, Mass. 02181.

Monolithic Cuts Circuit Prices

SUNNYVALE, Calif. — Monolithic Memoriex Inc. has reduced 100-quantity prices on its 57110/-67110 microprogram controller circuits by 45%, citing higher yields and increased volume.

The 67110J commercial-temperature-range version in ceramic package was cut from $25 to $14 in lots of 100-999, while the 57110D military version was dropped from $55 in the same quantities to $28.

Monolithic Memories is at 1165 E. Arques Ave., Sunnyvale, Calif. 94086.

Printer Unveiled

SHELTON, Conn. — A printer whose character sizes are said to be programmable has been introduced by Practical Automation, Inc.

The DMTP-6 series of printers is available in three sizes to handle paper 3-7/16 in., 6 in., and 8.5 in. wide. Up to four copies can be produced, the firm claimed. Throughput on a continuous duty basis is 50 char./sec, the firm added.

The DM 101 matrix print head has a seven-needle vertical array set around a two inch circle.

Single quantity prices are in the range of $200 to $380 from the firm at Trap Falls Rd., Shelton, Conn. 06484.

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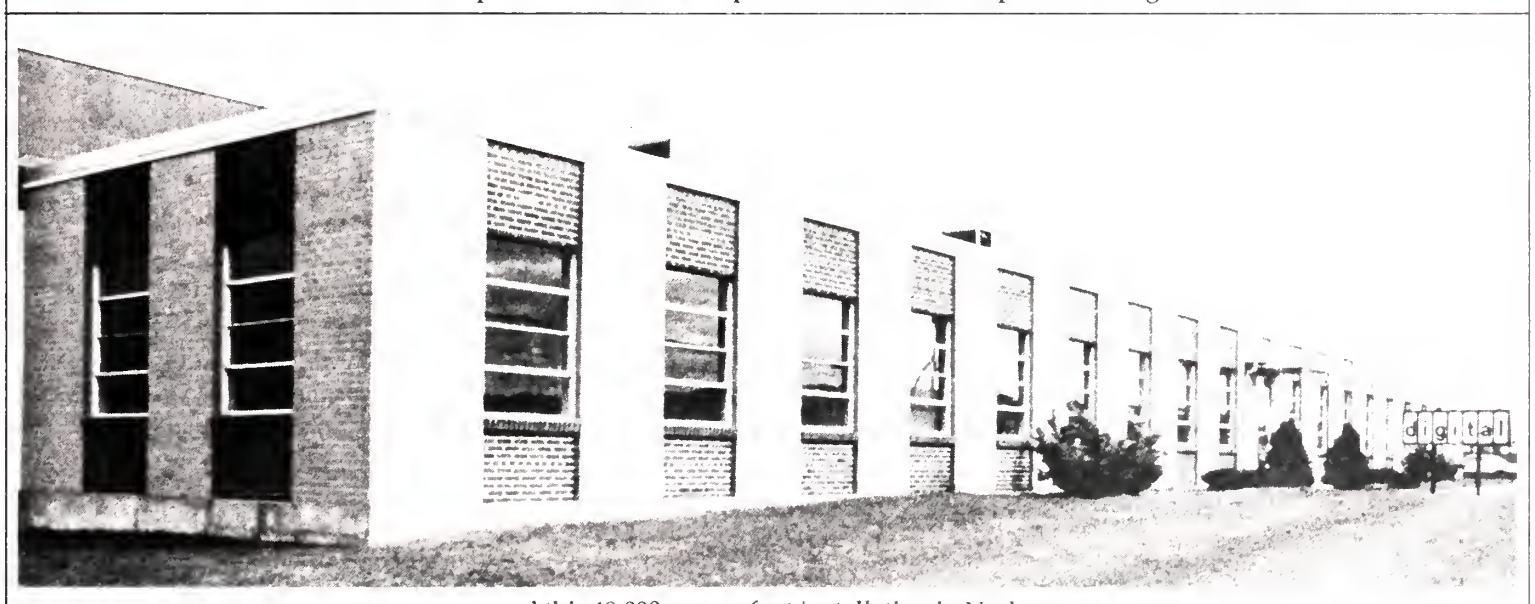

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NEC's 4-Bit Micros Bow

LEXINGTON, Mass. — NEC Microcomputers Inc. has unveiled the Ucom-4 family of 4-bit micros which include a user-specified masked read-only memory (ROM), an arithmetic logic unit, random-access memory (RAM) and I/O lines.

The units are designed for high-volume industrial and consumer products, the firm said. Prices range from $2 to $8 in large quantities.

The Ucom-42 with 1,920 by 10 bits of ROM and 72 instructions costs $6 to $8.

The Ucom-43 has 2K by 8 bits of ROM, 80 instructions and, like the 42, 96 by 4 bits of RAM and 35 I/O lines. It sells for $6 to $8.

The Ucom-44 costs between $2 and $3 and has 1K by 8 bit ROM, 64 by 4 bit RAM, 35 I/O lines and 58 instructions.

The Ucom-45 has 640 by 8 bit ROM, 32 by 4 bit RAM, 21 I/O lines and 58 instructions and costs about $2 in quantity, according to the firm at Five Militia Drive, Lexington, Mass. 02173.

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To Set Industry Ethics

Makers' Association Seen Needed

By Frank Vaughan
CW Staff

ATLANTIC CITY, N.J. — A call for a microcomptuer manufacturing association was made at Personal Computing '77, a recent microcomputing hobby show here.

Chris Rutkowski, president of Technical Design Labs, Inc., of Princeton, N.J., made the plea, noting that the industry needs something to establish industry ethics.

Rutkowski sees such an organization filling roles as registering all microcomputer distributors and dealers; registering software; working on standardization, for example the S-100 bus question, and possibly even evaluating claims of board compatibility.

The association is needed to give the fast growing industry some form of legitimacy, he said.

There are people that are selling products that they don't have and possibly never will and people that are taking customer's money with no intention of delivering a product, Rutkowski said.

Companies are making compatibility claims for products that are totally false and other forms of disreputable conduct are taking place, he said.

Conduct such as this is eroding confidence in the industry and hurting the legitimate firms, both large and small, who are trying to conduct their businesses in an honest manner, he added.

The association he sees ideally should be sponsored and controlled by either a professional society or a magazine, since the industry is proving unable to police itself, he said.

Rutkowski is at Technical Design Labs, Inc. Research Park, Building 11, 1101 State Rd., Princeton, N.J. 08540.

Microcosm

Intel Offers 5V, 8K Eprom Upgradeable to 16K ROM

SANTA CLARA, Calif. — Intel Corp. has introduced what it said is the first 5-volt, 8K-bit Eprom (erasable programmable read-only memory), the 2758.

Compared with Intel's 2708, the new 2758 can be operated on a single +5-volt TTL power supply, is directly upgradable to 16K masked ROM and allows one to change system storage capacity in 1K-byte increments with no design changes, the firm said.

The 2716 16K Eprom is directly compatible with the 2758 and 2316E, Intel added.

The unit also features reduced power and cooling costs, programming rates 2 to 2,000 times faster, depending on the number of bytes stored at a time, compared with the 2708, Intel said.

The 2758 stores 1K by 8 bits, is TTL-compatible in all modes and has a maximum access time of 450 nsec. It is available from stock in standard Eprom package (24-pin package with window for ultraviolet-light erasure) at $26.60 in 100-up quantities from Intel at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Data I/O 16 Loads Proms 1M Byte/Hr

ISSAQUAH, Wash. — Data I/O Corp. unveiled its Model 16 gang programmer which is said to be the first programmable read-only memory (Prom) programmer to deliver an erasable programmable read-only memory (Eprom) programming rate approaching 1M byte/hour.

The Model 16 programs 16 Proms simultaneously, performs sum-check tests automatically to guarantee data integrity and checks continuity of programmer, socket and Eprom, the firm claimed.

The programmer includes RS-232C serial I/O with selectable rates of 110-, 300-, 1,200-, 2,400-, 4,800- or 9,600 bit/sec and operates in asynchronous, half or full-duplex modes.

A 2K-byte by 8-bit expandable random-access memory (RAM) is standard.

Prices start at $4,800 from Data I/O at P.O. Box 308, Issaquah, Wash. 98027.

Quay's 90 Is Z-80 Based

FREEHOLD, N.J. — Quay Corp.'s 90 MPS is a single board Z-80 based microcomputer system for OEM systems and development work.

The basic board includes 6K bytes of memory, two Z-80 parallel I/O chips which provide 4 parallel I/O ports, an RS-232C interface, 2.5 MHz. crystal clock, a Z-80 counter timer, and a prom programmer for 2708 type Eproms.

The 4K dynamic RAM can be expanded to 65K bytes using 16K x 1 devices, and a total of 7K bytes of 2708 Eprom can be installed on the board, Quay said.

The basic Quay 90 MPS is priced at $695 in single quantity and $500 in OEM quantities from P.O. Box 386, Freehold, N.J. 07728.

Panasonic Has 4-Bit Micros

SECAUCUS, N.J. — Panasonic Electronic Components is offering the MN1400 series of 4-bit microcomputers that contain 75 instructions and have a 10 microsec instruction cycle time.

There are three models: MN1400, 1402 and 1498, in addition to an evaluator chip, the MN1499, all made by parent company Matsushita.

The MN1400 series incorporates a number of functions previously included in auxiliary circuitry such as an 8-bit presettable countertimer, clock generator, 1K by 8 bits instruction ROM and I/O ports.

The price is $8.50 in lots of 1,000 from the firm at One Panasonic Way, Secaucus, N.J. 07094.

AMI Expedites Ion Implant

SANTA CLARA, Calif. — American Microsystems, Inc. (AMI) reports doubling the production rate of implanted silicon wafers used in making MOS integrated circuits by adding Varian Extrion Division implantation systems.

"Implantation time is half," Dan Gracia, production manager, noted. "The process is more controllable and the costs are lower."

AMI is using a total of three Extrion systems to implant boron and phosphorous ions in the silicon wafers.

The ion implanters are being used in the production of both custom and standard circuits, employing C-MOS, P-MOS and N-MOS processes.

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Retailers Taking Gradual Approach

West Europeans Proving Slow to Install POS

By Don Ryder
Special to CW

Automation has made far greater strides into U.S. retailing operations than into European ones in the last five years. In fact, between 1971 and 1976, 10 point-of-sale (POS) devices were shipped to U.S. retailers for every one shipped to Western European retail outlets.

There are various reasons for this imbalance. For one thing, Europeans have not yet agreed on a standard equivalent to the U.S. Universal Product Code (UPC).

Europeans also are less likely to drive to do their shopping than U.S. shoppers. Often they just walk to a nearby shop, generally a small neighborhood one. Thus there are fewer big supermarkets that can cost-justify extensive POS installations.

But all that is starting to change.

NCR reported a healthy order book for both its NCR 255 checkout system and its NCR 280 general merchandising terminal system.

France, the European leader in terms of numbers of supermarkets and hypermarkets, reported a large number of NCR 255 installations with prominent names such as Carefour, Codec and Euromarche among the users.

IBM has until recently concentrated its European success in department stores. A recent installation of this type is at Bainbridge in Newcastle, England, which houses an IBM 3650 retail store system with 110 cash registers and automatic magnetic wording of price tickets.

IBM also reported an extensive 3650 installation (over 1,000 terminals) in West Germany's Quelle chain. Until now, IBM's 3600 supermarket system has had few European takers, but at least one Dutch supermarket is evaluating an IBM laser-beam checkout scanning system.

Sweda International has been actively marketing its POS system throughout Europe and has now achieved a customer base in many European countries, including the UK, Italy and Spain.

A major factor accounting for this success is the fact that its systems have been specifically designed and written for the European retail industry, according to Sweda.

A country-by-country survey of European POS activity provides the following summary:

- France: The leader in installation growth in Western Europe because of the early development of hypermarkets and supermarkets and because a high degree of shopper acceptance of modern retailing techniques. Also, the chains and large department stores in France were quick to experiment with POS in terms of partial implementation with a view to later full-scale installation.
- West Germany: The biggest and richest computer market in Europe. Now the leader in annual shipments of POS, West Germany is gradually overtaking France in total number of installations. Coupled with the strongest economy in West Europe, is a high degree of consumer acceptance of POS.
- Switzerland: Advanced in degree of acceptance of POS. Installations went in early and Switzerland ranks high in European league table if allowances are made for the smaller computer population.
- Scandinavia: There are some big installations, particularly in Sweden and Denmark, and there is consumer acceptance but the ultimate total size of the market is less than half that found in West Germany, France or the UK. This simply reflects the relative size of the various national economies.
- Italy: Surprisingly high POS acceptance in the supermarkets and cash-and-carry installations in the north of the country.
- U.K.: Poor economic climate has kept U.K. from growth in POS installations comparable to West Germany and France. Management has taken a wait-and-see attitude and most installations have been on a trial purposes only. The situation is now beginning to change but consumer resistance could be a problem.

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Highly visible, and promotable positions are available for software professionals who have above-average credentials in definition and design at advanced levels in the following areas:

- **Distributed Processing Architecture**
- **Computer Aided Design & Development**
- **AD/DA Systems Interface**
- **Top-down Systems Design**
- **Data Base Systems**
- **Real Time Systems**
- **Systems Diagnostics**
- **Signal Processing**
- **Stored Program Digital Systems**
- **Telecommunication switching and control systems (microprocessor or large CPU controlled)**
- **Large scale on-line systems management and executives**
- **Simulation**
- **Application Software**

If you have recent experience in one or more of these areas and a BS, MS, or PhD in Electrical Engineering, Computer Science, Math or the equivalent in technical qualification and accomplishment, we would like to tell you more about this major expansion in our long term research and development program. We are committed to maintaining our position of leadership in this exciting new field, and as a member of the GTE Family (ranked among the top R&D spenders in industry in 1976), can provide you with the support and resources to do the job.

For rapid contact,

CALL TOLL-FREE (800) 323-1966

In Illinois call (800) 942-0491

weekdays from 8 am to 5 pm cdt

Or forward your resume, including recent salary history to: Manager of Technical Employment, Dept 471 A6

GTE AUTOMATIC ELECTRIC LABORATORIES
400 N. Wolf Road
Northlake, IL 60164

An Equal Opportunity Employer M/F

Sunny So. California

Many of our clients require solid OS COBOL experience and positions ranging from 14,000 to 19,000 + $ depending on specific additional experience. Applications include financial, distribution, retail, and manufacturing. Relocation is negotiable. Forward resume or contact Duncan White at:

ROBERT HALF PERSONNEL AGENCIES
3600 Wilshire Blvd. Ste 1914
Los Angeles, CA 90010
(213) 286-6805
or Joe Mannella
Robert Half of Orange
500 S. Main, Orange, CA.
(714) 835-4103

FLORIDA POSITIONS

Staffing now for our client firms. We need professional programmer/analyst. Compensation commensurate with ability and proven track record.

Systems/Prog. - OS/VS, JES II, HASP, COMTEN, ASP, SYS. GENS and INTERNALS.
Applications - MANUFACTURING, ACCOUNTING and BANKING.
Teleprocessing - CICS, IMS, TASKMASTER and BTAM/TCAM/QTAM.
Scientific - PDP/11, DATA ACQUISITION and SIMULATION.

Contact or submit resume with geographical preference and current salary.

Frank Leonard Personnel
1211 N. Westshore Blvd, Ste. 100
Tampa, Florida 33607
(813) 872-1853

ANALYST/PROGRAMMER

300 bed community hospital in southeastern Wisconsin is seeking an ambitious self-starter to design, program and implement financial and patient management applications for IBM 370 hardware utilizing COBOL, BAL and CICS. The successful candidate will have the ability to work independently, function as a project leader and communicate well with user departments. Background should include formal education coupled with significant accomplishments in application analysis and programming. Experience in DBMS and system programming an asset. Send resume and salary rqmts to: Personnel Dept., West Allis Memorial Hospital, 8901 W. Lincoln Ave., West Allis, Wisconsin 53227.

SYSTEMS PROGRAMMERS

Leading private educational institution in the NYC metropolitan area seeks additional staff for our academic computer center. Center has latest DEC-10 system hardware, including KL-10 processor.

Candidates must have DEC-10 Systems experience including the following:

- **Knowledge of operating systems.**
- **Systems programming**
- **Assembly language programming**
- **State-of-the-art programming techniques**
- **Capability of supervising software design, development and maintenance.**

Excellent benefits - 4 weeks annual vacation, tuition assistance and growth environment. Send resumes to:

Mr. James M. Nast
Dir. of Personnel Relations
Stevens Institute of Technology
Hoboken, N.J. 07030
Equal Opportunity Employer M/F

Asst. Director-MIS

Rare opportunity to be +2 in large Eastern Mass. company. Must be strong administrator with 370-DOS experience in operations and systems. $20 - $24,000 (Fee Paid). Contact Jim Staunton (617) 423-6440.

All Positions Fee Paid
ROBERT HALF PERSONNEL AGENCIES OF BOSTON, INC.
140 Federal Street, (23rd floor), Boston, MA 02110
FINANCIAL & EDP PERSONNEL SPECIALISTS

COMPUTER PROGRAMMER

We have an immediate opening in our corporate data processing department which services manufacturing and distribution facilities throughout the United States, for an experienced Programmer. Experience of more than 2 years with a manufacturing company is required. CICS, VSAM and DL-1 data base systems experience a definite plus.

Equipment consists of IBM 370-135 DOS-VS installation with telecommunications. Languages COBOL and Assemblers.

We offer an outstanding work environment and an excellent range of benefits. Call for appointment or send resume for confidential consideration. Include salary history and requirement.

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1505 E. MAIN, URBANA, ILL.
PH. 217-384-1800 An Equal Opportunity Employer

FACULTY POSITION PAN AMERICAN UNIVERSITY

School of Business Administration

Assistant or Associate Professor beginning January, 1978. Should hold an earned doctorate in Computer Science, Management Information Systems or related field. Teaching and/or industry experience is desirable. Salary range for the nine-month academic year is $17,800 - $21,600 depending on qualifications.

Closing date for receiving completed applications for above position, including resumes, copies of transcripts and list of references is October 31, 1977. Contact Dean R.N. McMichael, School of Business Administration, Pan American University, Edinburg, Texas 78539.

Pan American University is an Equal Opportunity/Affirmative Action Educational Institution and Employer.

PROGRAMMER ANALYSTS with Retail Experience

Fortune 500 company and leading fast food chain has openings for Programmer Analyst experienced in financial and marketing applications.

Successful candidates will be self-starters capable of moving into positions of higher responsibility.

You should have 3-5 years experience in IBM 360/370 DOS environment and in depth knowledge of COBOL. Knowledge of EPAT, FM AINT, PANVALET and Task Master desirable. Minimum of 2 years college training.

Minority and female applicants welcomed.

CW Box 3187
797 Washington St.
Newton, Mass. 02160

Marlboro is...

Advancement in Laboratory and Medical Data Products.

Digital's Laboratory Data Products and Medical Data Products group in Marlboro, Massachusetts are where both ideas and professionals have a unique upward mobility. Developing and marketing products for the medical and research communities, we actively encourage ideas and proposals from professionals at all levels. The result . . . an exciting environment with a high degree of professional growth and advancement.

If you want your contributions to have real impact, LDP in Marlboro is where you should be!

Senior Programmer
Quality Assurance

Working with a team of systems programmers you'll be responsible for developing product test tools, writing product test drivers and quality assurance plans for Standard MUMPS. You will be a member of the development team and will be a key contributor in assuring a high quality product is distributed to DIGITAL customers. A technical degree or equivalent, knowledge of Operating System design and PDP-11 Assembly language programming are all essential. A working knowledge of MUMPS would be very desirable.

Senior Programmer
MUMPS Application

This is your opportunity to be a major contributor to the development of a new Digital Medical Information System. You will work with a team of skilled programmers in the design of a Medical Record, Accounts Receivable and Scheduling system for group practice environments.

The individual we're seeking will be a dynamic, self-motivated professional with a technical degree or equivalent, 3-4 years experience in MUMPS application coding. Effective communications skills and the ability to productively interact with Marketing and Sales are also essential.

Senior Programmer
Applications

We're seeking a self-starter who can work effectively with Marketing and Sales to define a new product in the field of industrial research and development. You must be able to work both independently and with other groups.

This position requires 2-3 years programming experience in industrial applications such as Process Engineering, Chemistry, Manufacturing, R & D Lab, or Testing Lab. You must also have 1-2 years experience with RSX-11 M or D plus a technical degree or equivalent. Real-Time Data Acquisition experience would be a definite asset.

We are also seeking individuals with a solid background in Real-Time Data Acquisition, Signal Processing, and or writing supporting software for new hardware peripherals.

The challenge and opportunities you've been looking for are waiting for you at Digital in Marlboro. Please forward your resume including salary history and requirements and indicating area of interest to Carol Reed Digital Equipment Corporation 200 Forest Street, Marlboro Massachusetts 01752. We are an equal opportunity employer m f.

We're the company looking for people.

digital

SYCOR

SYCOR CONTINUES ITS PROGRAM OF NATIONAL EXPANSION!

As a leading force in the tehnological development and manufacture of distributed data processing systems, our need for Systems Engineering and Sales Professionals continues to grow. Openings exist in major cities throughout the U.S. for career-oriented people in the following areas:

SYSTEMS ENGINEER

COBOL or Assembler programming experience essential, communications with bi-sync and on-line background helpful. Ideal candidate will have the above experience, a BS degree, and a background in either Micro-Mini systems or programmable terminals or systems support. Any exposure to data entry applications and marketing customer support would be an asset.

SALES REPRESENTATIVES

Requires a minimum of 3 years terminal, peripheral or small systems sales experience, plus a general knowledge of D applications including communications. Candidates must display the proven ability to meet sales quotas for a complete line of computer products and support services.

We offer a competitive range of salaries, comprehensive benefits and highly visible opportunities for future growth. To arrange an interview send your resume to:

Gopi R. Jindal
SYCOR, INC.
100 Phoenix Drive
Ann Arbor, MI 48104
(313) 995-1156

SYCOR INC

As an Equal Opportunity and Affirmative Action Employer, Sycor, Inc., Urges Females and Members of Minority Groups to Apply.

"Sycor Puts Computer Power Where the Work Is"

SYCOR

DATA PROCESSING PROFESSIONALS

Due to recent internal expansion, Lennox Industries Inc., a nationally recognized leader in the heating and air conditioning field, has positions available for Systems Analysts, Senior Applications Programmers and Applications Programmers.

Processing environment is a 370/158 under OS/VS1 providing real time and batch teleprocessing services for many locations throughout the United States and Canada.

These positions offer a competitive compensation and benefit package and excellent opportunity for growth.

Please submit a resume which includes salary history to:

John Dugan
Lennox Industries Inc.
200 S. 12th Avenue
Marshalltown, Iowa 50158
An Equal Opportunity Employer

EXPANSION

Within the next year, more than 100 PROGRAMMERS and PROGRAMMER/ANALYSTS will be moving to one of the Midwest's most beautiful cities, a city of 450,000 people living in an unpolluted atmosphere with a moderate cost of living and the cultural advantages of a city twice it's size.

Our client, a large securities firm, is expanding their EDP staff and has immediate openings for PROGRAMMERS and PROGRAMMER/ANALYSTS. The successful individuals will have 1 to 5 years experience on large IBM systems operating OS, will be proficient in COBOL, and have exposure to IMS Data Base and DL/1. A degree and knowledge of financial or insurance applications will prove a great plus. Starting salaries range from $12-18,000.

The company offers a unique, very advanced training and incentive program along with excellent benefits. Advancement potential is among the best in the country.

For further information, rush your resume today or call Jeff Holmes in complete professional confidence.

dorsey love & associates inc.

P.O. Box 4486 Glenstone Station
Springfield, Missouri 65804
(417) 883-1212

UNIVERSITY OF PETROLEUM AND MINERALS

DHAHRAN, SAUDI ARABIA

The University of Petroleum and Minerals, Dhahran, Saudi Arabia, will have graduate faculty positions open for the Academic Year 1978-79 for teaching-research in the areas of Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering and Mathematics. The responsibilities include:

(A) Six contact hours teaching load per semester.
(B) Research in individual's area of specialization.
(C) Advising of senior projects and MS thesis.

Applicants should hold PhD degree and should have at least five years experience in research-graduate education.

Minimum regular contract for two years, renewable. Excellent salaries and allowances, air conditioned furnished housing will be provided, and free air transportation to and from Dhahran each two-year tour. Attractive educational assistance grants for school-age dependent children. Local transportation allowance in cash each month. All earned income without Saudi taxes. Ten months duty each year with two months paid vacation and possibility of participation in University's ongoing Summer programs with adequate additional compensation.

Apply with complete resume on academic and professional background, list of references, and a complete list of publications with clear indication of those papers published in refereed professional magazines journals, research details, and with copies of degrees including personal data such as family status (wife's maiden name, names of children, age and sex) home and office addresses, telephone numbers to:

University of Petroleum and Minerals
c/o Saudi Arabian Educational Mission
2223 West Loop South, Suite 400
Houston, Texas 77027

CAREER OPPORTUNITIES

With one of the world's most advanced computer complexes

The Los Alamos Scientific Laboratory, a multi-program national research organization, is seeking mature professionals who have the demonstrated ability to contribute to our programs in computational science. The installed major computers include a CRAY-1, four CDC 7600s, two CDC 6600s, two CDC Cyber 70 Model 73s and IBM 1360 Photostore, and an IBM 370/148-3850 Mass Storage System. These computers are linked together through an Integrated Computer Network (ICN), which also provides terminal access to the timesharing systems. Remote Terminals number in excess of 850.

CAREER OPPORTUNITIES - COMPUTER PROFESSIONALS

OPPORTUNITY #1 — Will propose and lead innovative applied research projects in the area of large-machine operating systems. The successful candidate will have a relevant Ph.D plus strong experience in operating systems and leadership ability. Experience in one or more of the following areas is highly desirable: systems programming, storage systems, computer architecture, networking, or distributed computing. Publication of research results is expected.

OPPORTUNITY #2 — Will participate in the design and development of an operating system for the CRAY-1 computer. A relevant Ph.D, and demonstrated knowledge is required in one of the following areas: operating and storage systems, systems programming, performance modeling and analysis, computer architecture, distributed computing and networking.

OPPORTUNITY #3 — Will propose and conduct applied research in the area of performance measurement, modeling, and analysis. The successful candidate will have a relevant Ph.D, experience in performance measurement, and one or more of the following areas: operating systems, computer architecture, distributed computing or networking. Publication of results is expected.

OPPORTUNITY #4 — Will be responsible for system maintenance and support software for UNIX systems and for integration of PDP-11/70s into the ICN. A degree in relevant field plus experience with UNIX systems and PDP-11 hardware is required.

OPPORTUNITY #5 — Will work in applied research in support of the LASL ICN and other staff members involved in the design and implementation of ICN systems modules. Must have research experience in the area of computer networks and have a knowledge of (CDC 7600 class) operating systems, interface components, network control components, and remote terminals. A relevant degree is required.

OPPORTUNITY #6 — Will provide hardware IC designs for interfacing CDC, DEC and other computers. A B.S./M.S. in Computer Science or Electrical Engineering with solid experience in computer systems, digital design, and hardware input/output interfaces is essential.

OPPORTUNITY #7 — Will be responsible for designing, coding and debugging real-time programs in assembly language. Will participate in the design and implementation of system modules for the ICN. The successful candidate will have a BS/MS degree in a related field and experience with minicomputer operating systems. Knowledge of minicomputer hardware electronics interfaces, computer network design and network interface components is essential.

CAREER OPPORTUNITIES - COMPUTER MAINTENANCE TECHNICIANS

OPPORTUNITY #8 — Will fabricate, checkout, and maintain a large variety of computer interface and communications equipment. The successful candidate will have more than 3 years experience with chassis layout, fabrication, wiring harnesses, and digital logic circuits. Technical instituted graduate is preferred.

OPPORTUNITY #9 — Will maintain computer based computer output microfilm systems including minicomputers, analog and digital circuitry, computer peripherals, high speed automatic cameras and film processing equipment. Position requires 4 or more years experience in the above areas. Experience on the Information Interantional FR 80 is desirable.

OPPORTUNITY #10 — Will maintain high speed automatic cameras, film processors, precision positioning mechanisms, and related equipment. The successful candidate will have 4 or more years experience in film processing and interest in the field of minicomputers.

Individuals interested in these or other career opportunities should submit a complete resume and salary history incomplete confidence to:

los alamos SCIENTIFIC LABORATORY

Charles M. Mikkelson, Employment Representative
Division - 77-BF
Los Alamos Scientific Laboratory
P.O. Box 1663
Los Alamos, New Mexico 87545

Interview will be arranged for qualified candidates.

AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER
Women, Minorities, Veterans and Handicapped Urged to Apply
U.S. CITIZENSHIP REQUIRED

Engineering

NCR PROJECT LEADER

SAN DIEGO LOCATION

To lead a group of 10 engineers and programmers engaged in the design of

ON-LINE HIGH-SPEED MICR/OCR READER - SORTER SYSTEMS

The selected individual must have a broad background in the design of software and/or hardware for medium scale business data processing systems and their application in the field of financial data processing. Strong knowledge in all of the following is desired plus recent and successful design experience in at least two of them, preferably the latter two:

- MICRO/OCR READER - SORTER PERIPHERAL DEVICES
- READER - SORTER CONTROLLERS
- FINANCIAL APPLICATION PROGRAMS SUCH AS TRANSIT AND PROOF OF DEPOSIT
- SYSTEM SOFTWARE INTENDED OR EXTENDED FOR ON-LINE READER-SORTER CONTROL

The position involves direction of the ongoing design activities plus heavy coordination/liaison with OEM vendors of document handling devices, hardware and software quality assurance organizations, corporate program management, and other NCR divisions.

Technical management experience is essential as the design organization is expected to grow.

BSEE or BCS or equivalent; MS desirable. Minimum of 10 years' applicable experience. Salary commensurate with ability and experience.

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents.

To arrange an appointment, please send resume immediately including salary history, training and experience to the professional Placement Office at the address below.

NCR
Data Processing Division
16575 W. Bernardo Drive
San Diego, Calif. 92127

An Equal Opportunity Employer

SOFTWARE PRODUCT DEVELOPMENT

Link your career to the unprecedented growth of ADR's Software Products Division. Participate in defining, developing, and enhancing our software product line. WE are interested in dedicated software professionals who are capable of doing advanced software development. If you have proven outstanding talents in the job areas shown below, we believe you will want to consider career opportunities at ADR.

SYSTEMS PROGRAMMERS

- MVS experience highly desirable.
- Familiarity with OS internals essential.
- Computer science degree or 2 years experience.

PROGRAMMER/ANALYSTS

- Strong IBM Assembler language background.
- On-line systems development experience in an OS environment.
- At least 2 years experience or a computer science degree.
- Familiarity with DOS and CICS desirable.

MACRO PROGRAMMERS

- Experienced in high-level language interface to Data Base/Data Communications systems.
- IBM Assembler background necessary.
- Working knowledge of COBOL essential.

Some Facts About ADR . . . founded in 1959 . . . development personnel average well over 8 years with company . . . field and sales personnel average over 5 years . . . stable (over $15 million last year) . . . traded on American Stock Exchange . . . employs over 300 people . . . small enough for personal recognition . . . informal and flexible environment . . . representatives throughout the world . . . software product line diverse, versatile, state-of-the-art . . . excellent employee benefits.

Please send resume with full details including current salary and position desired in complete confidence to: Personnel Director Software Products Division

APPLIED DATA RESEARCH, INC.
Route 206 Center, CN-8
Princeton, N.J 08540
An Equal Opportunity/Affirmative Action Employer

SYSTEM SOFTWARE DEVELOPMENT PERSONNEL

The VIP Agency of Palo Alto has a number of challenging opportunities to offer EDP professionals with an interest in the development of system and application software:

- Communications
- Operating Systems
- Data Base/Data Management
- Real Time Communication and Process Control

If you have an interest in mini/micro processor software development call (collect) (415) 493-3111.

VIP

VIP Agency Inc.
2 Palo Alto Square
Suite 316
Palo Alto, CA 94304
Employer Paid Fee

FIELD ENGINEERS

Two field engineers: one junior level with experience and one senior level. Duties involve installation and maintenance of Data General systems configurations such as disk, tape, line printer and CRT. Two years technical training. Associate degree or equivalent. $15,000 to $20,000. All company benefits including dental. Profit sharing after one year. Send Resume to P.O. Box 924, Redondo Beach, Calif. 90277.

Data Processing

Opportunities in Information Systems

Land O' Lakes, Inc.

Everybody is looking for D P professionals, right? So why should you talk to LAND O'LAKES?

- LAND O'LAKES INC is a large agri-business firm with sales in excess of $1 billion that has exciting and ambitious plans for the future We can offer competitive salaries commensurate with experience excellent benefits and working conditions
- We currently have an impressive staff of experienced professionals and a dynamic people oriented shop that can exercise and develop your very finest management and technical skills and provide the opportunity to achieve your professional objectives
- LAND O'LAKES is based in beautiful Minneapolis MN City of Lakes where you will find a unique cultural educational and living/working environment

PROGRAMMERS — We have current opportunities for top notch programmers to work with a variety of applications including distribution, manufacturing and finance/accounting. We have several openings for individuals with 2 to 4 years experience in ANSI/ COBOL and multilanguage programming along with remote entry utilizing IBM 370 series computers in OS/VS with CICS/VS.

SYSTEMS ANALYST — 2 to 4 years experience with the development and implementation of systems for manufacturing, product cost and inventory control plans. People having good communication skills and experience with remote users of distributed processing. College degree in Computer Science and experience in IBM hardware is highly desirable.

Write or call: Bill Goodwin, LAND O'LAKES, INC. P.O. Box 116, Minneapolis, MN. 55440. Toll-free 1-800-328-7566.

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LAND O LAKES

PROGRAMMING CAREER OPPORTUNITIES

CONTROL DATA CORPORATION is seeking sionals who have IBM background to work on our Mass Storage System which is a major new development in the computer industry.

* SOFTWARE ARCHITECT

Minimum of 3 years experience in the design of IBM operating system related software. Must possess internals knowledge in the state-of-the-art IBM virtual systems. Requires experience in assembler language, utilities, data management, job management and supervisor services. Knowledge of TSO, JES 3 and VSAM is desirable. Requires good organizational and documentation skills. Development activities are conducted in a structured design/programming team environment.

* SOFTWARE SUPPORT SPECIALISTS

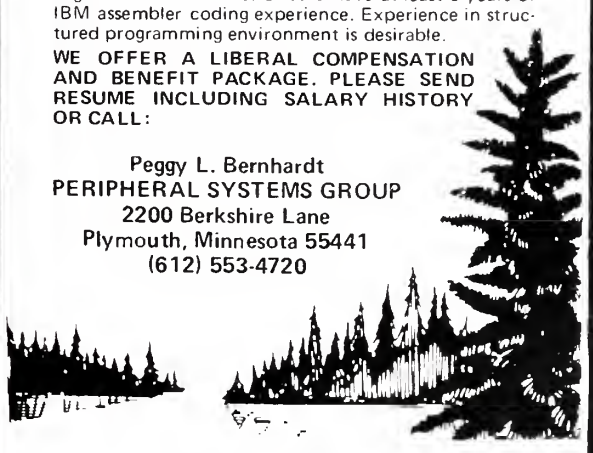
Minimum of 3 years IBM system programming experience with internal knowledge of MVT, VS1, SVS or MVS. Knowledge of O/S utilities, data management, job management and supervisor services required. Must be willing to accept short term domestic and European travel assignments.

* SYSTEM PROGRAMMERS

Minimum of 3 years IBM system programming experience with internal knowledge of MVT, VS 1, SVS or MVS. Knowledge of utilities, data management, job management and supervisor services required. Knowledge of TSO desirable. Should have at least 3 years of IBM assembler coding experience. Experience in structured programming environment is desirable.

WE OFFER A LIBERAL COMPENSATION AND BENEFIT PACKAGE. PLEASE SEND RESUME INCLUDING SALARY HISTORY OR CALL:

Peggy L. Bernhardt
PERIPHERAL SYSTEMS GROUP
2200 Berkshire Lane
Plymouth, Minnesota 55441
(612) 553-4720



CONTROL DATA CORPORATION

An Affirmative Action Employer M F

HARRIS
is
EXPLODING!

The search may be on for some, but we ask - WHY SEARCH?

Good talent deserves outstanding opportunities. At Harris Computer Systems Division WE HAVE BOTH!

GROWTH OPPORTUNITIES EXIST NOW at our divisional headquarters in sunny Fort Lauderdale, Florida, as well as our field locations. The following are examples

FIELD-East Coast, Midwest, SW and NW
SALES MANAGERS
Total Systems

FIELD ANALYSTS
Experienced, Large Systems

CUSTOMER ENGINEERS
CPU's & Peripherals

FORT LAUDERDALE-Division Headquarters
DESIGN ENGINEERS

QUALITY ASSURANCE
Components, etc.

SOFTWARE ANALYST
Compilers, Systems or Benchmark

TECHNICAL WRITERS
Hardware, Software or Marketing

INSTRUCTORS
Hardware of Software

DESIGN ENGINEERS
Logic or Circuit Design

MECHANICAL ENGINEERS
Package Design or Project

If you are a data processing professional and feel that you would like to make a change with a fast growing Fortune 500 company such as Harris we would appreciate your taking the time to complete and clip out the information requested below This will be held in the strictest confidence.

I am interested in the following areas

__Software Development
__Manufacturing
__Quality Control
__Sales
__Engineering Design & Development
__Field Service Support
__Field Analyst Support
__Accounting & Administration
__Personnel

NAME_____

ADDRESS_____

CITY_____ STATE_____ ZIP _____

__ Enclosed is my personal resume for your convenience

Attn: W D Taylor, Manager of Employment, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Fort Lauderdale, Florida 33309

HARRIS
COMMUNICATIONS AND INFORMATION HANDLING

An Equal Opportunity Employer Male and Female

position announcements | position announcements | position announcements | position announcements | position announcements

PROGRAMMERS

CPA firm (Big 8) seeking entry level and experienced programmers to join rapidly expanding computer group in lower Manhattan.

Positions offer challenge and growth potential. Salaries commensurate with experience and academic achievement. No travel involved.

Individuals must be imaginative, motivated, and degreed (Computer Sciences preferred for entry level positions).

Send resume and salary history to:

P.O. Box 279, Dept. DMA
Bowling Green Station
New York, N.Y. 10004

Equal Opportunity Employer

TIME SHARING SPECIALIST

Provide training and technical support to assist time sharing users at Corporate headquarters. A Bachelors degree or equivalent in Computer Science, Statistics or Math and two years of FORTRAN experience are required.

Send resume and salary, or call:

Mr. Robert Rendl
(414) 228-2375
GLOBE-UNION INC.
5757 N. Green Bay Ave.
Milwaukee, WI 53201

equal opportunity employer m/f

COMPUTER PROFESSIONALS:

Come enjoy the good life in San Diego!

Move ahead with one of the world's most successful computer manufacturers while living in one of America's most acclaimed vacation centers. San Diego offers you the climate of your choice, from the cool mild breezes of the ocean to the constant dry warmth of true desert—and every gradation in between. Create your special lifestyle in a hilltop hacienda, an urban highrise, a country club condominium. Explore mesas and canyons, 70 miles of local beaches and bays, the byways of Baja. Continue your professional education in one of the area's many major colleges and universities, enjoy sports all year, from tennis to whale-watching. NCR—for a good living *and* a good life.

Immediate openings in these areas

- **FIRMWARE**
- **DIAGNOSTIC PROGRAMMING**
- **PERFORMANCE MEASUREMENT**
  (GPS Simscript Modeling/Simulation)
- **SOFTWARE CONFIGURATION MANAGEMENT**
  (Design, develop programs to support software testing, release and repair)
- **SOFTWARE DEVELOPMENT**
  (Design/implementation of multi-program O/S in a high level language. Experience desired in data base or telecommunications, distributive processing, virtual machine, time sharing)

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents, generous relocation allowance.

Please send resume immediately including salary history, training and experience to the Professional Placement Office at the address below

NCR DATA PROCESSING DIVISION
16575 W. Bernardo Drive, San Diego, Calif. 92127

An Equal Opportunity Employer

FIELD SERVICE

SYSTEMS	370/360, H-200, XDS, Univac, CDC All Large & Medium CPU's
MINI's	PDP, NOVA, G.A., HP, etc. All Mini Systems
I/O	STC, TELEX, CDC, ITEL, CALCOMP, etc. All Peripheral Experience

MTTR
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1107 Mannheim Road $12-30K
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Private Employment Agency
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ASSISTANT DIRECTOR SYSTEMS MANAGEMENT

Starting salary $21,486 annually. Requires a four year college degree in Computer or Systems Science, Business Administration or Public Administration or Accounting plus seven years responsible administrative and/or technical data processing experience in these specific areas: four years experience in programming and/or systems design; two years experience in responsible computer operations duties. At least three years of the total experience requirement must have involved supervisory duties. Acceptable experience may substitute for the required education on a year for year basis but no substitution will be allowed for the required supervisory experience. Please apply:

Hillsborough County Civil Service
700 Twiggs St., 1st Floor
P.O. Box 1110
Tampa, FL 33601
Equal Opportunity Employer

SYSTEMS PROGRAMMER

We are a major force in Iowa banking and have a challenging opportunity for an individual capable of filling a key position within our company. The person we seek will be responsible for the generation and performance evaluation of DOS/VS, CICS/VS, and VSAM as well as other related systems software. If you would enjoy having an excellent opportunity to grow and learn, a salary limited only by your ability, a competitive benefit program, a chance to work with the latest IBM hardware and software systems, and the contentment of working in a pleasant midwestern city, please submit your resume to:

Ronald D. Long, AVP
Brenco Automation Center, Inc.
717 Mulberry, Suite 503
Des Moines, Iowa 50309
A subsidiary of Brenton Banks, Inc.

Management Information System Developers

Career positions are open that require strong computer skills in Fortran, Basic and Mark IV plus business or marketing knowledge. Person selected will design, implement and maintain an M.I.S. for business units and do forecasting and statistical analysis.

Position will involve file coordination of existing systems and management of new reporting formats. Past experience with M.I.S. design, handling and usage needed.

Excellent opportunity to work with high level languages, IBM 370 or Cyber 73 computers, and the latest Tek graphic terminals. Strong future potential in EDP, business or marketing management.

COMPUTERS

Located near Portland, Oregon we are within a two hour drive the the Cascade Mountains and Ocean Beaches. The close-by nature playgrounds and the city of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include liberal educational support, insurance and profit sharing programs.

Please send detailed resume and salary history to Larry Green TEKTRONIX, INC., P.O. Box 500, C94, Beaverton, Oregon 97077.

An Equal Opportunity Employer M F H.

Tektronix
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PROJECT LEADER

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NCR 151 192K B-3

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(Northwest Chicago Suburb)

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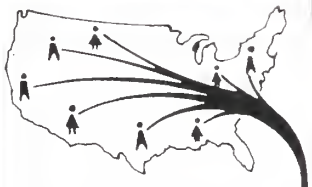

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Expanding International Firm of CPAs seeks computer system professionals for openings in New York, Washington, Cleveland, Hartford, Atlanta, Chicago, Kansas City, St. Louis, San Francisco, and other U.S. offices. Skills in two or more of the following areas are required:

- Evaluation and selection of hardware and software;
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Personnel Director

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Our location is a progressive, well-run small city, affording very pleasant living. Salary will reflect qualifications, with Harris benefits additional. Relocation may be assisted. Please send resume, indicating experience, achievements, and salary record, in confidence to: Lawrence R. Carlstone, Professional Employment Supervisor, Harris Corporation, Broadcast Products Division, Quincy, Illinois 62301

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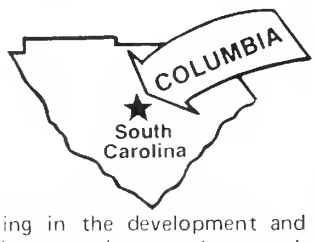

NCR's Communication Systems Division, specializing in the development and manufacturing of data communications products and systems, is currently expanding its COMMUNICATIONS SOFTWARE group.

Get in on the ground floor of advanced communications design and participate in NCR's entry to DISTRIBUTIVE NETWORK ARCHITECTURE consisting of a series of microprocessor based terminal systems and node connected by communications lines.

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NCR Corporation
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If you have a strong background in systems methodology and have solid administrative credentials, R.J. Reynolds Industries, Inc. has a challenging opportunity for you. Your job will be to take charge of a major data processing systems standards development program in an environment moving from DOS/VS to OS/MVS.

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We offer outstanding compensation, top benefits and relocation assistance, and ample opportunity for professional growth in one of the most rapidly growing areas of our company. Please send resume indicating earnings record to Mr. Denis G. Simon, Manager of Employment, R.J. Reynolds Industries, Inc., 401 N. Main St., Winston-Salem, N.C. 27102.

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Associates, a consumer and commercial financial services corporation, has an immediate opening for a highly motivated degreed individual to contribute significantly in the creation and monitoring of an ITF. The successful candidate will report to the Director of EDP Audit.

Preliminary Responsibilities:

- Have previous knowledge of or quickly assimilate, through IBM educational facilities, the Airline Control Program (ACP) systems architecture encompassing an IBM 370/155 supporting 1200 online terminals.
- In conjunction with Associates Computer Services (ACS), implement a test data base functionally representing the online production data base. This individual will be responsible for the data selection criteria, not the technical creation of the data base.
- Create a transactional input stream representing the scope of the online system.
- Verify ITF control totals and financial reports.

Ongoing Responsibilities:

- Advise and consult senior corporate and ACS management on system reliability.
- Monitor contents of ITF data base and transactional input stream initiating updates to reflect production system changes.
- Audit ACS systems group executing ITF system.
- Periodically execute ITF and independently reconcile the control totals and financial reports.
- Perform selected EDP Audit functions.

Knowledge and Skills:

- Knowledge of data base structures and controls, preferably ACP system architecture.
- Three or more years systems and programming activity in a financial environment, preferably in Passenger Airline Reservation System Financial (PARSF).
- Excellent written and oral communication skills.
- The ability to interface with many organizational levels of personnel in an effective manner.

If you feel you have most or all of the above qualifications and a desire to achieve in a highly visible corporate positions, please forward your resume including salary requirements to:

THE ASSOCIATES

Mr. L. P. Von Stein
Director of EDP Audit
Associates Corp. of North America
P.O. Box 22822
Dallas, TX 75222

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THE BACKGROUND:

Computer graphics is our specialty at Tektronix Information Display Group, and we grow 50% per year alone. We're meeting our challenge, head on, but we need more top people to help us. We offer competitive salaries, good benefits, and the opportunity to reach the potential peak in the near future. We will back you with the training, the office services, the products, and the technology that has revolutionized our end of the computer industry.

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Tektronix

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CAD/CAM

MDSI is the recognized leader in the development and marketing of high technology computer products and services for manufacturing applications. Our mission calls for a long term commitment to further development of CAD/CAM products and services. To meet this major objective, we seek additional innovative people wo are capable of assuming a key position as immediate contributors to advancing the state-of-the-art.

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- Create system specifications and application software for modules of an integrated manufacturing structure. Requires solid manufacturing applications design/programming experience and knowledge of general purpose data base management systems and structured system/program design techniques.

CAM PROGRAMMERS

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Must have solid working knowledge of all IMS utilities including DBD, PSB and MFS Control Blocks generations, backup/recovery/reorganization, Stage 1 Sysgen, Securitygen, MTO, performance monitoring, tuning, various access methods, TSO, JCL & OS utilities.

Data Base Analysts—Development

Requires experience in IMS data base physical design, involving logical relationships and secondary indexing and use of developmental aids such as DB Prototype, etc. Familiarity with UCC-TEN Data Dictionary a plus.

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Policy/Guidelines Analysts

Requires experience in IMS DB/DC and OS. Oral and written communication skills also essential. Exposure to developing policies, procedures and guidelines, preferably in Data Base Administration, a big plus.

Please send resume including project accomplishments and salary history to: **Ms. M. G. Helms, Atlantic Richfield Company, Room 317, 645 South Mariposa Avenue, Los Angeles, Calif. 90005**

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$18-$23,000
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Send resume and salary requirements to CW Box 3191, 797 Washington St., Newton, MA 02160.
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- PROJECT MANAGERS
- PROGRAMMERS
- PROGRAMMER/ANALYSTS
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IMS, Incorporated
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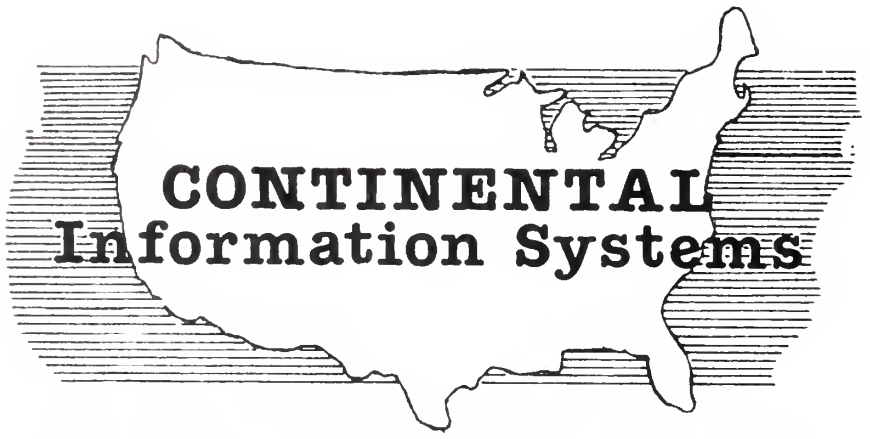

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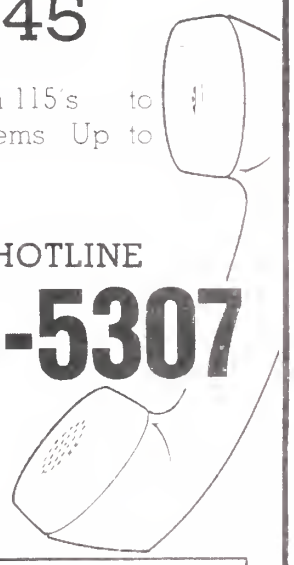

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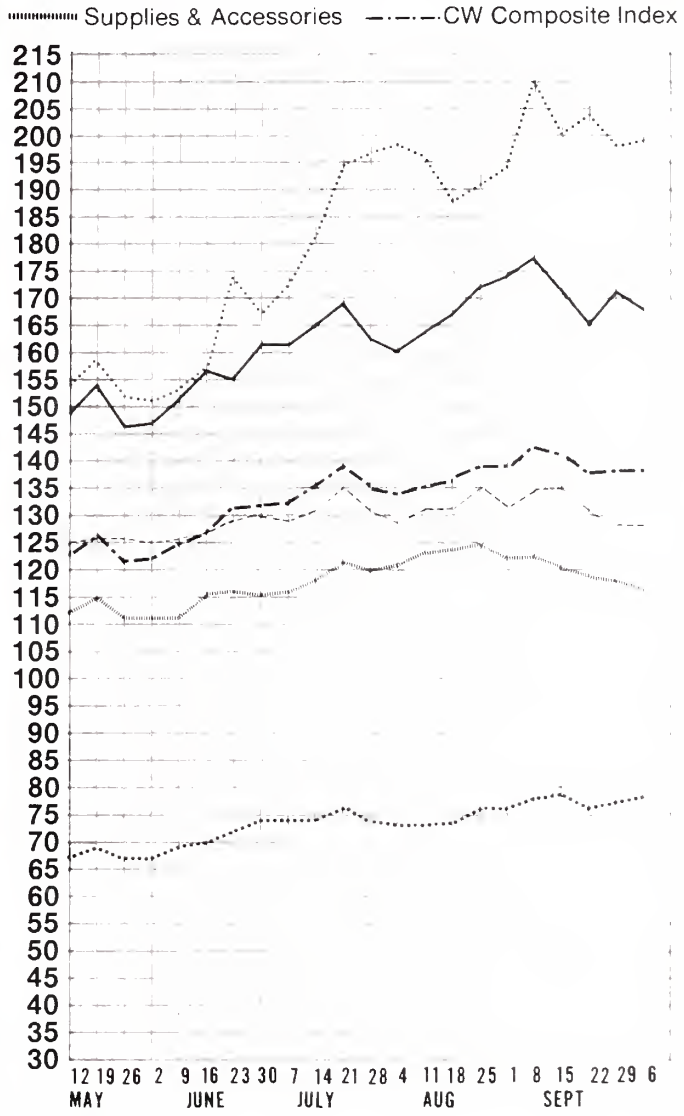

Earnings Reports

HONEYWELL
Three Months Ended June 30

	1977 (000)	1976 (000)
Shr Ernd	$1.41	$.95
Revenue	705,923	a604,271
Tax Cred	2,434	2,232
Earnings	29,634	19,376
6 Mo Shr	2.88	1.63
Revenue	1,369,047	a1,145,629
Tax Cred	6,414	3,236
Earnings	60,492	32,929

a-Restated

ADVANCED MICRO DEVICES
Three Months Ended June 26

	1977	1976
Shr Ernd	$.40	$.31
Revenue	19,564,000	13,196,000
Earnings	1,093,000	849,000

APPLIED DATA RESEARCH
Three Months Ended June 30

	1977	1976
Shr Ernd	$.30	$.35
Revenue	5,136,220	3,901,376
Tax Cred		200,000
Earnings	406,530	423,051
6 Mo Shr	.55	.62
Revenue	9,625,404	7,232,797
Tax Cred		363,000
Earnings	744,285	755,766

APPLIED MAGNETICS
Three Months Ended June 30

	1977	1976
Shr Ernd		$.10
Revenue	$17,088,000	16,054,000
Earnings	a(2,753,000)	421,000
9 Mo Shr		.20
Revenue	48,350,000	45,629,000
Earnings	a(3,588,000)	842,000

a-Reflects provision for inventory writedown and reversal of previously recognized tax benefit of $2,100,000

ATLANTIC RESEARCH
Six Months Ended June 30

	1977	1976
Shr Ernd	$.97	
Revenue	15,856,000	$11,542,000
Earnings	465,000	151,000

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 5, 1977

TRADE*QUOTES,

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1977 RANGE (1)	CLOSE OCT 5 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	39 1/2	-4 1/2	-10.2
N	BURROUGHS CORP	55- 91	68 3/8	- 3/8	-0.5
O	COMPUTER AUTOMATION	18- 30	23 1/4	-1 1/4	-5.1
N	CONTROL DATA CORP	20- 26	21 1/4	+1 5/8	+8.2
O	CRAY RESEARCH INC	15- 29	24	-1 3/4	-6.7
N	DATA GENERAL CORP	35- 51	46 1/4	-2 1/4	-4.6
N	DATAPOINT CORP	18- 32	29 3/8	- 1/2	-1.6
N	DIGITAL EQUIPMENT	37- 53	46 1/2	-1	-2.1
N	ELECTRONIC ASSOC.	2- 3	1 7/8	0	0.0
A	ELECTRONIC ENGINEER.	8- 11	10	- 1/2	-4.7
C	FOUR-PHASE SYSTEMS	13- 19	17 3/4	- 1/2	-2.7
N	FOXBORO	42- 54	45 3/4	+1 1/2	+3.3
O	GENERAL AUTOMATION	6- 9	6 7/8	+ 3/8	+5.7
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	69- 87	76	-2	-2.5
N	HONEYWELL INC	44- 55	44 7/8	- 1/2	-1.1
N	IBM	245-286	257 3/8	-2 1/8	-0.8
O	MANAGEMENT ASSIST	5- 9	7 5/8	- 3/8	-4.6
O	MEMOREX	23- 34	29 3/4	-1 1/8	-3.6
O	MICRODATA CORP	7- 18	13 1/8	+ 7/8	+7.1
C	MODULAR COMPUTER SYS	5- 8	6 3/8	- 3/8	-5.5
N	NCR	32- 47	46	- 1/2	-1.0
O	PRIME COMPUTER INC	12- 23	20 5/8	- 1/8	-0.6
N	PERKIN-ELMER	17- 22	20	0	0.0
N	RAYTHEON CO	16- 33	30 1/2	+ 3/4	+2.5
N	SPERRY RAND	33- 42	32 1/2	-1	-2.9
O	SYCOR INC	8- 15	11 1/2	- 3/8	-3.1
A	SYSTEMS ENG. LABS	5- 8	6 3/8	- 1/2	-7.2
A	WANG LABS.	10- 14	12 3/8	+ 1/4	+2.0

LEASING COMPANIES

O	ALANTHUS CORP	3- 5	4 3/4	- 1/8	-2.5
O	BOOTHE COMPUTER CORP	8- 10	10 1/4	+ 1/4	+2.5
C	COMDISCO INC	10- 13	12 1/4	0	0.0
A	COMMERCE GROUP CORP	1- 3	1 1/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1	- 1/8	-11.1
M	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 2	2 1/8	+ 1/4	+13.3
N	DPF INC	6- 9	9 3/8	+ 1/4	+2.7
N	ITEL	13- 22	20	-1	-4.7
N	LEASCO CORP	19- 27	23 3/4	+ 3/8	+1.6
O	LEASPAC CORP	1- 2	1 1/4	0	0.0
C	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 1/2	- 1/8	-2.2
N	U.S. LEASING	10- 15	13 3/8	+ 5/8	+4.9

SOFTWARE & EDP SERVICES

O	ADVANCED COMP TECH	1- 2	1/2	- 1/8	-20.0
O	ANACOMP INC	7- 10	8 1/2	+ 1/4	+3.0
A	APPLIED DATA RES.	5- 10	7 3/4	+ 1/4	+3.3
N	AUTOMATIC DATA PROC	23- 30	25 3/4	- 3/8	-1.4
O	COLEMAN AMERICAN COS	2- 2	1 7/8	- 1/4	-11.7
O	COMPU-SERV NETWORK	10- 15	11	- 1/2	-4.3
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
C	COMPUTER NETWORK	6- 11	9 7/8	- 5/8	-5.9
N	COMPUTER SCIENCES	7- 9	8 5/8	+ 3/8	+4.5
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
C	COMPUTER USAGE	1- 3	1 3/8	+ 1/8	+10.0
O	COMSHARE	5- 8	7 1/4	+ 1/4	+3.5
O	DATA DIMENSIONS INC	3- 5	3 1/8	0	0.0
O	DATATAB	1- 2	1 3/8	- 1/8	-8.3
N	ELECTRONIC DATA SYS.	15- 20	15 7/8	+ 3/8	+2.4
O	INSYTE CORP	2- 3	1 3/4	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 5/8	0	0.0
O	KEANE ASSOCIATES	3- 4	4 1/4	+ 3/8	+9.6
O	KEYDATA CORP	2- 3	1 3/4	0	0.0
A	LOGICON	7- 17	11 1/2	+ 3/8	+3.3
A	MANAGEMENT DATA	1- 2	1 3/8	- 3/8	-21.4
A	NATIONAL CSS INC	19- 27	26 3/4	+1 5/8	+6.4
O	NATIONAL DATA CORP	4- 7	7 1/8	+ 1/4	+3.6
A	ON LINE SYSTEMS INC	16- 22	16 7/8	+ 1/2	+3.0
N	PLANNING RESEARCH	3- 6	4 3/4	- 1/8	-2.5
O	PROGRAMMING & SYS	1- 1	1/4	0	0.0
O	RAPIDATA INC	2- 3	2 1/8	- 1/4	-10.5
O	REYNOLDS & REYNOLD	17- 20	19	+ 1/4	+1.3
O	SCIENTIFIC COMPUTERS	1- 4	4 1/8	+ 1/4	+6.4
O	TYMSHARE INC	14- 23	20 1/8	+1 5/8	+8.7
A	URS SYSTEMS	4- 5	4 1/2	+ 1/2	+12.5
N	WYLY CORP	1- 2	7/8	+	+7.6

PERIPHERALS & SUBSYSTEMS

N	ADDRESSOGRAPH-MULT	13- 15	14 1/8	+ 5/8	+4.6
O	ADVANCED MEMORY SYS	7- 9	8 7/8	0	0.0
N	AMPEX CORP	8- 11	10	0	0.0
O	ANDERSON JACOBSON	3- 5	3 3/4	+ 3/8	+11.1
N	APPLIED DIG DATA SYS	10- 20	19 1/4	+ 3/4	+5.5
O	BEEHIVE INT'L	8- 12	9 7/8	+ 3/8	+3.9
A	BOLT,BERANEK & NEW	7- 9	8 5/8	0	0.0
N	BUNKER-RAMO	8- 12	10 7/8	+ 1/2	+4.8
A	CALCOMP	3- 5	3	0	0.0
O	CAMBRIDGE MEMORIES	1- 4	3 3/8	+ 1/8	+3.9
N	CENTRONICS DATA COMP	22- 30	22 7/8	- 3/8	-16.0
C	COGNITRONICS	1- 1	3/4	+	+9.0
O	COMPUTER COMMUN.	5- 8	6 7/8	- 1/8	-1.7
O	COMPUTER CONSOLES	4- 7	4	0	0.0
A	COMPUTER EQUIPMENT	2- 3	2 7/8	- 1/4	-8.0
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
O	COMTEN	9- 13	10 1/4	- 1/4	-2.3
N	CONRAC CORP	19- 28	21	0	0.0

SUPPLIES & ACCESSORIES

A	AMERICAN BUS PROCS	6- 8	6 1/4	0	0.0
O	BALTIMORE BUS FORMS	2- 4	1 1/2	- 1/8	-7.6
A	BARRY WRIGHT	10- 14	13 1/8	0	0.0
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	17 3/4	+ 1/4	+1.4
N	ENNIS BUS. FORMS	6- 7	6 1/8	+ 1/8	+2.0
C	GRAHAM MAGNETICS	11- 17	17	0	0.0
C	GRAPHIC CONTROLS	14- 18	14 1/4	0	0.0
N	3M COMPANY	48- 56	50 3/8	+ 3/8	+0.7
O	MOORE CORP LTD	26- 37	26 1/4	- 1/4	-0.9
N	NASHUA CORP	16- 28	19	-6 3/8	-25.5
C	STANDARD REGISTER	16- 25	19 3/4	0	0.0
O	TAB PRODUCTS CO	13- 19	15 3/4	+ 1/4	+1.6
N	UARCO	19- 22	19 7/8	+ 1/8	+0.6
A	WABASH MAGNETICS	10- 15	12	+ 1/2	+4.3
N	WALLACE BUS FORMS	17- 21	18 1/8	- 1/4	-1.3

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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